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POTT'S DISEASE IN CHILDREN.

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THE following notes are based on a study of cases of Pott's disease met with at the Royal Alexandra Hospital for Children during the past ten years. In the first instance I hoped to produce a classification of end-results; but in view of the low incidence of the disease in this country, and also of the doubt present in my mind as to what actually constitutes an end-result in childhood, I have endeavoured in this paper to try to cover a slightly wider field. (In Graph I is plotted the incidence of all forms of tuberculosis per thousand of children admitted to the children's hospitals in Melbourne, Sydney, Adelaide and Brisbane during the period 1927 to 1937.)

An attempt has therefore been made to classify the cases at a period of not less than five years from the inception of treatment, and to analyse most of those factors which have a bearing on the end-result and which may enable us to arrive at some conception of the problem of Pott's disease in this country, as compared with the disease in other parts of the world.

Presumably the ideal to be aimed at as the end-result of treatment in tuberculosis of the spine is the arrival at that state in which the active progress of the disease is at a standstill, with encapsulation of the focus, and in which the balance and stability of the spine cannot be improved by further treatment. In Table I is given under various headings an analysis of some of the more important clinical features of the disease in this series.

Ætiology.

Tuberculosis of the spine is primarily a disease of childhood; more than 50% of all cases occur between the ages of three and five years. In this

TABLE I.

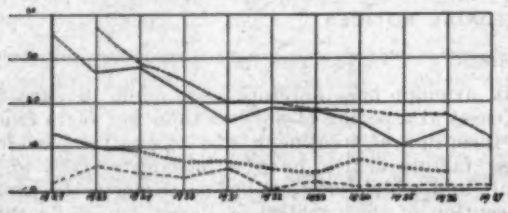
Clinical Analysis of 81 Cases of Pott's Disease.

Average Age.	Number of Males.	Number of Females.	History of Trauma.	Initial Lesion: Number of Bodies Affected.	Ultimate Lesion: Number of Bodies Affected.	Location.	Tenderness.	Duration of Symptoms.	Length of Stay in Hospital.	Pyuria.	Family History of Tuberculous Infection.	Deformity on Admission to Hospital.	Number of Deaths.	Paraplegia.	Abscess.	Other Lesions.	Number Readmitted to Hospital.	Number of Operations (Fusion).
4 to 5 years	45	36	4	2·7	3·1	T. 40 T.L. 13 L. 25 L.S. 2 C. 1	1	10 months	39 months	13	23	66	12	5	51	15	14	5

connexion must be borne in mind the structural differences between the adult and the child spine, and the fact that this disease is a far more destructive process in the growing, mobile and not fully ossified spine of the child. In this series the average age of children admitted to hospital will be seen to be four to five years. This figure does not necessarily indicate with accuracy the age at which the disease was contracted, as some of these children had been treated elsewhere prior to their admission, and in some the disease had been overlooked for a considerable time before their arrival for treatment.

The theory that trauma plays an important role as a contributing causal factor has always been maintained; this may be suggested by the preponderance of males over females, the proportion being 45 males to 36 females. Taylor states that trauma is a distinct element in 53% of all cases. It will be noticed, however, that it has been recorded in only 5% of all cases in this group.

A history of contact with a tuberculous person or of tuberculous affection in immediate relatives was obtained in one-third of all the cases.



GRAPH I.

Graph showing the incidence of all forms of tuberculosis per thousand of sick children admitted to the children's hospitals in Melbourne, Sydney, Adelaide and Brisbane during the period from 1927 to 1937. Melbourne is represented by the unbroken line, Sydney by the dotted line, Adelaide by the line of dots and dashes, and Brisbane by the line of dashes.

Symptoms.

A study of the symptomatology reveals the extreme variability of the reactions to this disease in childhood. Though the average duration of the symptoms at the time of admission to hospital was as long as ten months, many patients gave a history of a few weeks' duration only; in some cases the disease was stumbled on by the radiologist. The natural conclusion is that tuberculosis of the spine can be, and often is, a silent disease, and that the majority of patients appear for treatment at a time when bone destruction is well advanced.

H. J. Seddon states: "Referred pain is often missed and it seems that deformity monopolizes the conception of early signs of Pott's disease." It seems more than probable, then, that symptoms of any description indicate gross pathological changes. It is not surprising, therefore, that the earliest symptoms to be noted are awkwardness and deformity in that order; furthermore, it is an astounding fact that parents frequently overlook gross deformity for a prolonged period before seeking advice.

Pain is a still later manifestation; it is generally of the referred type, and can closely simulate many forms of abdominal disorder. Deformity was noticed to be present at the time of admission to hospital in 80% of all cases; this is probably a conservative estimate, but its frequency offers further proof that the disease can be symptomless until such time as gross bone destruction has interfered with the stability of an intervertebral joint. As a matter of fact, close inquiry will often elicit a history of vague ill health and weakness as a forerunner of the symptoms I have mentioned. The presence of a limp as an early symptom often focuses attention on the hip joint, and I may be pardoned for reminding you that this has frequently been a misleading factor in the recognition of Pott's disease.

The frequently reiterated plea for earlier diagnosis on the part of many writers seems rather an optimistic suggestion, if it is borne in mind that radiological findings are mostly discernible only when the destructive process has become considerable.

An attempt was made to form some estimate of what might be called the initial lesion, though it is obviously not possible to make any useful deductions from the result. The figure given, "2·8 vertebræ", merely indicates the radiological findings at the time of admission to hospital; in other words, the number of vertebræ in which the changes were gross enough to be appreciated radiologically. The frequent surprises at autopsy must be borne in mind, for autopsy invariably reveals destruction in a greater number of vertebræ than had previously been indicated radiologically.

The same factor holds good in any attempt to form an idea of the average spread of the disease

whilst the patient was under treatment; actually an extension was noted to have taken place in fifteen cases, representing a total number of thirty additional vertebræ involved.

The location of the disease, as shown in the table, is most frequently in the thoracic region. This fact does not call for any particular comment, the relative distribution corresponding to that given by other observers.

Complications.

Paraplegia occurred as a complication in five cases (a normal incidence), and in four others spasticity and slight weakness were noted during treatment. Two of these children are still in hospital, their condition being unchanged; they contracted the disease five years ago and eight years ago respectively. One of them has a hopeless prognosis, the sphincters being involved. One patient is now nineteen years of age, and though he has recovered from the paraplegia, he is a chronic invalid. The remaining two patients are dead. One was subjected to laminectomy, now an operation of ill repute and the only one of its kind reported in this series.

Abscess has been estimated by various writers to occur as a complication in from 10% to 99% of all cases, and its frequency has been stated to be in direct ratio to the effectiveness of the fixation. In this group of cases it has unfortunately not been possible to distinguish between abscess and abscess going on to sinus formation, and the figure of 61% represents the sum of both conditions. Draining sinuses tend to prolong the duration of the disease and definitely increase the mortality rate. Abscesses associated with lesions in the thoracic region are characteristic, in so far as they seldom escape from the thorax, being limited above by the fascia at the root of the neck and below by the diaphragm. They are best seen in antero-posterior skiagrams; and it is just as important in estimating the progress of the disease to study their behaviour in serial skiagrams as it is to follow the developments of the lesion in the bone. Figures I to IV are reproductions of typical radiographs; and Figures V and VI are tracings taken from two radiographs.

Operative Treatment in Pott's Disease.

Reference to Table I indicates that there were five operations for spinal fixation, and in another series of case notes lent to me by Dr. W. Vickers a further five cases were recorded.

It will be convenient to analyse these ten cases together. In one case only was a satisfactory result arrived at, from the point of view of the time factor; actually this was achieved in a space of time shorter than could reasonably be expected with purely conservative treatment. Six of these patients developed abscesses after operation, five suffered from an increase of the deformity and two became paraplegic. The average post-operative stay in hospital was twenty-six months.

The experience in this small group supports the opinion widely held in England that stabilizing operations are definitely contraindicated for children with active disease, and that posterior bone grafting is foredoomed to failure in the absence of satisfactory anterior bone consolidation. It cannot be denied, furthermore, that the stability of the kyphos is dependent on adequate vertebral contact.

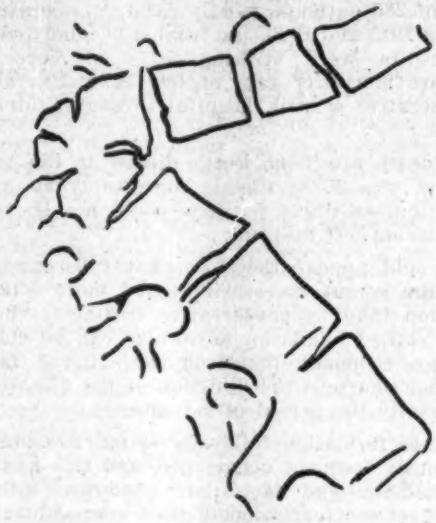


FIGURE V.

Tracing from a skiagram in a case of cured thoracic disease, showing progressive deformity due to absence of secondary curves and poor anterior fusion. The patient was a girl, aged nineteen years.

FIGURE VI.

Tracing of superimposed skiagrams of a child with disease situated low in the thorax; *A* shows the condition four years after spinal fusion operation, *B* the condition four years later. Increased deformity has taken place. Further deformity is inevitable in this case on account of the poor anterior bone consolidation evident in the original skiagram.

Situated as we are, with a minimum of material, we are more or less compelled to be guided by reports from more populous centres. It is nine years since Russell Hibbs published his second end-result study of 286 patients, mostly children, operated on between 1915 and 1920, and it must be admitted that his results were striking—70% of cures, an operative mortality rate of less than 1%, and a post-operative stay in hospital averaging nineteen months.

The death rate from Pott's disease in this series, however, was 26%; this is conceivably an underestimation, as thirty patients could not be traced after having left hospital.

It would appear therefore that tuberculosis of the spine is not necessarily cured more often by operation than by conservative treatment; but in highly skilled hands an advantage can be claimed from an economic point of view, in so far as operation shortens the duration of the disease and incidentally the period of recumbency.

Abscess formation following spinal fixation is a notoriously frequent occurrence, and this has been explained by the fact that posterior splinting encourages the formation of dead space anteriorly. This explanation does not appear reasonable, however, as no graft is powerful enough, in the absence of adequate anterior fusion, to withstand the bending forces of the superincumbent weight of the upper spinal segment.

Analysis of the Results of Treatment.

In Table I I have attempted to summarize the results of treatment from both a radiological and a clinical point of view. The number of untraceable patients has been a disappointment; but a proportion of these have been classified by their latest skiagrams, only a very small number being left absolutely unaccounted for.

In the clinical classification, class A represents those who might be termed "cured", who undertake full activity and suffer no ill health referable to their disease. Class B comprises a more doubtful group, those who are compelled to rest part of the time, but remain fairly well with minor symptoms only. Class C are the uncured or those whose disease has become active again. Severe kyphosis *per se*, even though unbalanced, has not been regarded as a severe disability in the estimation of fitness, as it is realized that in many of these cases excellent anterior fusion has occurred.

A radiological classification has also been undertaken, partly as a check on the clinical classification and partly to enhance the value of this analysis.

In group A are those patients who have sound bone fusion or close fibrous union. Group B includes those with a wider gap (insecure fibrous union), and group C those with an extensive gap.

Discussion.

A falling tendency is noted in the incidence of all forms of tuberculosis treated by the children's hospitals at Melbourne, Sydney, Adelaide and Brisbane during the ten-year period 1927-1937. Whereas in Melbourne and Adelaide the rate was 36 and 37 per thousand of sick children admitted to hospital in 1927, those figures dropped in 1937 to 13 and 12 per thousand. The general decline is noteworthy, in view of the larger populations and increasing numbers of patients treated by all the hospitals concerned.

It is natural to assume, then, that cases of tuberculous disease of the spine are yearly becoming more infrequent in this country, and it would seem from all the figures available that there has been one patient with Pott's disease to every nine tuberculous children admitted to the children's hospitals of these cities. This average appears to have been maintained up to the present time.

TABLE III.

Showing the Relationship of Admissions due to Tuberculosis and Pott's Disease to the Total Number of Admissions to the Children's Hospitals at Melbourne, Sydney, Brisbane and Adelaide during the period from 1927 to 1937.

	Melbourne.	Sydney.	Brisbane.	Adelaide.
Total admissions	45,365	92,090	37,572	24,129
Admissions due to all forms of tuberculosis ..	901	670	92	399
Admissions due to Pott's disease ..	96	81	11	22

It is not an easy matter to make a commentary based on such a small group of cases; nevertheless, a few points emerge which appear to merit discussion.

TABLE II.

Analysis of End-Results.

Clinical Analysis.							Radiological Analysis.						
Class A	Class B	Class C	Class D	Total.	Not Classified.		Class A	Class B	Class C	Class D	Total.	Not Classified.	
					Too Recent.	No Trace.						Too Recent.	No Skiagrams
12	7	13	12	49	15	17	14	8	21	12	55	15	11

There seems to be an impression current that Pott's disease in children manifests itself in a milder form in this country than it does in the more crowded parts of the world. No doubt its extraordinarily low incidence has been an influence in creating this idea. A glance at Table I would suggest, however, that this disease runs true to form in this part of the world, and that it is just as viciously destructive to life and limb as it has always been elsewhere. In spite of our healthy climate and favourable situation, it is every bit as difficult to obtain satisfactory end-results here as it is anywhere in the world.

Class A end-results, it will be noted, number 12 out of a total of 49 cases classified clinically; the remainder, 32, are either too recent for classification or else the patients are untraceable. It is quite possible that the total of twelve patients in class A could be added to, as ten of the untraceables are included in the radiological classification, and to judge by their skiagrams, five of them are probably fit and well. I have been a little more fortunate with those classified radiologically; and it will be seen that recent skiagrams from 55 cases have been examined with the results shown.

Without offering any further comment, I must point out that class C and class D results are more than twice as frequent as those in class A, and it may be mentioned also that reports of results of treatment from other parts of the world suggest a somewhat higher percentage of cures than is shown in this analysis. It will be seen that 12 of these 81 patients are dead; this represents an immediate death rate of 14·8%.

Henry Gauvain mentions a mortality rate of only 3·8% in a review of 1,666 cases at the Treoloar Cripples' Hospital from 1918 to 1935. McKee, in a group of 100 patients over sixteen years of age and under observation for six years, admits to a death rate of 10%. Earlier in the present century the mortality rate was given as anything from 20% to 38%.

It seems almost impossible to estimate accurately the mortality rate of Pott's disease in children, as they do not remain children; but it may be stated that a considerable percentage of all patients die during the progress of the disease, and that it is a matter of common observation that few of those who are greatly deformed arrive at old age.

A word in reference to the treatment of Pott's disease may not be out of place at this stage. Is it that we place a little too much faith in the beneficial influences of our sunshine and climate, and perhaps trust overmuch to methods of restraint that could be considered just a trifle exiguous? The influence of Rollier has been easily discernible in the methods used by many who are undertaking the treatment of surgical tuberculosis in this country.

It will no doubt be agreed by the majority that insecure methods of fixation have no place in the treatment of bone tuberculosis today. I emphatically express myself in favour of the use of fixation apparatus, which implies hyperextension, in the treatment of this disease. It is certain that this method of immobilization does minimize the amount of bone destruction and therefore subsequent deformity. Its chief application, however, is in thoracic disease, the most destructive of all types of bone tuberculosis.

With regard to the rationale of hyperextension it is to be remarked that there are two schools of thought in connexion with this question; each, while agreeing with the other up to a certain point, involves a divergent conception of the reparative process.

McMurray made the following statement:

> The diseased spine should be placed in a position of hyperextension, the object being the prevention of knuckle deformity which follows on the collapse of the vertebral body, or its correction if this collapse and knuckling have already taken place.

The adherents of this concept, therefore, deliberately maintain an anterior gap by imposing hyperextension until the formation of new bone has bridged the space, thus arriving at a cure with a minimum of deformity.

There must be strong doubt as to whether this idealistic process does actually take place, and many observers state that they have never witnessed such a phenomenon.

Other exponents of the hyperextension treatment, however, do not hold that it is possible to prevent deformity once destruction has taken place; the underlying idea is to bring about a limitation of destruction during the active stage by effecting a separation between diseased surfaces, just as traction is applied to the lower limb in cases of *morbus coxæ*, with the object of minimizing attrition. Furthermore, it is held that attempts to maintain a gap between collapsing bodies by efforts directed towards the correction of the kyphosis in any stage of the disease are both ill-advised and impracticable. The divergence between these schools becomes more obvious in their management of the stationary stage of the disease: it is advised by the second school that hyperextension should be discontinued at this stage, so that the collapse, which should be regarded as inevitable, may be encouraged.

In any case, the next important point in the treatment should be concerned with the rehabilitation of the back muscles. After the disease process has come to a standstill, a period of the convalescence should be devoted to the nursing of the patient in the prone position. In addition to the beneficial effects on the back musculature, this position is useful in so far as it helps to restore spinal balance by promoting the formation of compensatory curves. Although the long curve so formed is not the ideal type, it is quite a useful one for the disease in the lumbar region. Finally, this is a favourable position for occupational instruction and therapy, of undoubted value in conserving the morale of the bed-ridden.

If the presence of a kyphosis in the stationary stage of the disease is assumed, it becomes neces-

sary to direct some attention to the restoration of balance by the introduction of short secondary curves above and below the lesion. As previously mentioned, long secondary curves tend to appear naturally from the adoption of the prone position during the convalescent period. These are segments of large circles tending to move the line of gravity posteriorly, and are probably adequate in cases of low disease associated with limited bone destruction.

A shorter type of secondary curve, however, should be the objective when a thoracic kyphosis is present. This can be introduced before the patient is allowed to walk by the use of sandbags placed above and below the lesion while the patient is being nursed in the dorsal position.

Those unfortunates with unbalanced thoracic deformity comprise the class in which late unpleasant complications generally develop. They are the "C3's" of Pott's disease, and whatever the degree of anterior consolidation, they inevitably become more deformed as the years go by.

If the conception that bone tuberculosis is cured by encapsulation of the focus is regarded as correct, then reactivation must be considered a possibility in any cured lesion, but more particularly if that lesion is so situated that it is unbalanced, insecure and subject to movement. These conditions are fulfilled in subjects suffering from gross uncompensated kyphosis.

Summary.

1. An analysis of 81 cases of Pott's disease has been made.

2. A classification of the condition of these patients has been undertaken at a period of not less than five years from the inception of treatment.

3. Emphasis has been given to certain aspects of treatment.

Acknowledgements.

I wish to express my appreciation of the assistance given by the almoners of the Royal Alexandra Hospital for Children. That department has access to information and records that made possible more successful contact with patients than could have been made in any other way.

I wish personally to thank Miss Davies and Miss Bryson for the time and labour they have given, without which this survey would have been made more difficult.

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TUMOURS AND MALFORMATIONS OF THE BLOOD VESSELS OF THE BRAIN AND SPINAL CORD.

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and

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Although tumours and malformations of the brain and spinal cord composed of blood vessels are by no means common, they are important. Those occurring within the cerebellum, usually in association with one or more cysts, constitute between 1% and 2% of all intracranial tumours. Because they are benign in nature every effort should be made surgically to effect their removal. In successful cases the gravest of symptoms may be completely and permanently relieved. Sometimes eradication of the tumour may be comparatively simple; at other times it may tax the skill and courage of the surgeon to the utmost.

We have encountered six patients with hæmangiomatous tumours of the cerebellum, of whom five, owing to the severity of their symptoms, were in urgent need of surgical intervention. All six survived operation and are well at the present time (June, 1939).

Angiomatous tumours and malformations of the brain and spinal cord may usually be distinguished from highly vascularized gliomata and meningiomata; but sometimes this distinction may be difficult or even impossible to make. The problem will be discussed in a separate paper.

Cushing and Bailey,[1] in their monograph, have divided blood vessel tumours into two major groups—angiomatous malformations and hæmangioblastomata or true tumours. This method of division was suggested by Luschke, who first described a cerebral angioma in 1854. Dandy,[2] however, who has had considerable experience with these growths and malformations, finds little fundamental difference between the types. He therefore uses the nomenclature of Rokitansky and classifies them as "cavernous angiomata". From the standpoint of clinical medicine, however, they fall into distinct groups, and probably may be best considered under the headings adopted by Cushing and Bailey.

Hæmangioblastomata of the Central Nervous System.

Of the tumours and malformations of blood vessels occurring within the central nervous system, by far the most important are the hæmangioblastomata of the hind brain and spinal cord. They form less than 2% of Cushing's series of intracranial tumours.[3] In our register of about 300 histologically verified tumours, six cerebellar hæmangioblastomata have been encountered (2% of all intracranial tumours, 13% of all cerebellar tumours). In addition, one hæmangioblastoma was found in the region of the *cauda equina*.

Hæmangioblastomata most commonly occur in the cerebellum. Here they frequently exist as a single mass, in association with single or multiple cysts. They may, however, be multiple, and also may be entirely solid. Sometimes they are associated with other abnormalities denoting a widespread developmental defect. Not only may several angiomata be found within the cerebellum, but others may be present within the spinal cord or medulla. Indeed, Levin,[4] who described such a case of multiple tumours and reviewed sixteen others reported up to 1936, found that in ten of seventeen cases in which a search was made, one or more tumours was contained within the substance of the spinal cord or in the nerve roots. Nevertheless it is unusual to find signs of coincident spinal cord disease with such cerebellar hæmangioblastomata as are diagnosed clinically.

It is significant also, as pointed out by Lindau,[5] that hæmangioblastomata of the central nervous system may be associated with angiomatosis of the retina, or von Hippel's disease, and with malformations and tumours of other organs, such as cystic pancreas, kidney cysts and hypernephromata of the kidneys or suprarenal glands. Lindau therefore believes that this condition, now called Lindau's disease, arises in a maldevelopment of the mesoderm during the third month of fœtal growth.

It is also of great interest to observe that Lindau's disease may be a familial condition, and indeed, according to Lindau, 20% of cases are familial. Retinal angiomatosis may occur in other members of the same family, either alone or associated with a hæmangioblastoma of the central nervous system. Lindau believes that 25% of patients suffering from von Hippel's disease show symptoms of some brain complication. In this respect the pedigree chart published by Møller may be referred to. Of eleven members of one family, distributed among three generations, no less than six were known to have had Lindau's disease or to have died presenting the symptoms of intracranial tumour.

Nevertheless angiomatosis of the retina is seen in only a small proportion of cases of hæmangioblastoma of the central nervous system. In our seven cases it was not observed, although sought for. It must, however, be borne in mind that the angiomatous mass may be microscopic in size, or concealed by gross pathological changes occurring in the retina. No gross degenerative changes were present in our cases. In its typical form a small hæmangiomatous nodule may be seen situated in the course of dilated retinal vessels.

Developmental defects of the abdominal organs are not usually encountered. Our seven patients still survive and clinically show no signs of such defects. The relative infrequency of visceral changes may be better judged from the series of six cases of cerebellar hæmangioblastoma reported from the Breslau clinic.[6] Of these, five patients survived operation for a short time only; at autopsy no changes of the type encountered in Lindau's disease were found, either in the abdominal organs or in the retinæ.

On the other hand, should angiomatosis of the retina be observed, or a family history of Lindau's or von Hippel's disease be obtained, when a patient presents himself with signs of cerebellar tumour, it may reasonably be assumed that the lesion is a hæmangioblastoma. Occasionally a correct diagnosis has been so made; but in the majority of cases of hæmangioblastoma the family history contains nothing of significance and no angiomatosis of the retinæ is found.

The frequent association of cysts with hæmangioblastoma of the cerebellum is well known. Indeed, not uncommonly it is the cyst rather than the tumour which produces the symptoms. Such a cyst may be of a large size, and the tumour but a nodule within its wall. This nodule may be small, but visible (as in our Cases II and VI), or microscopic and impossible to find at operation. One must, therefore, suspect any apparently simple cerebellar cyst of containing some small neoplastic mass of the nature of a hæmangioblastoma. Such a cyst has come under our notice and has been suspected of possibly harbouring a tumour, although we were unable to find it. Small astrocytomata may produce cysts of identical appearance.

On other occasions the tumour mass may be larger and the cyst or cysts may be contained within the tumour substance. Least commonly a solid tumour will be found unassociated with any cystic changes (Cases I and IV). It is now well known that almost any tumour arising within the brain or spinal cord may be associated with a cyst, secondary carcinoma being no exception. It does, however, appear as if the hæmangioblastomata are particularly liable to this association. It is thought that the somewhat inadequate method of drainage of waste tissue fluid from the deeper substance of the brain, and the facility with which the perivascular channels may be blocked, may account for the general tendency of intracranial tumours to cyst formation. The highly vascular nature of the hæmangioblastomata and the greater volume of fluid circulating may perhaps account for their special tendency.

Cyst formation, unfortunate as it may be in that it is on occasions the sole cause of the symptoms, may yet isolate a small tumour so that extirpation of the growth is a comparatively simple procedure. This is particularly so when the tumour lies in or just beneath the cerebellar cortex (Cases II and VI). Simple drainage of a cyst may result in a remission of symptoms; if, however, the tumour is not completely extirpated the cavity may rapidly refill and the symptoms recur.

Although hæmangioblastomata may be of microscopic dimensions or attain to quite a large bulk, they are commonly about the size of a pea. Their histological structure will be considered in detail in another paper. Usually large number of branching capillaries or larger spaces may be observed, frequently, but not always, containing blood. Between

the spaces, cells, considered to be endothelial, are found. Occasionally these cells may form masses and columns resembling those of the carotid body; in such tumours actual blood spaces may be scanty. Glial tissue is not usually found between the capillary loops. On fresh section hæmangioblastomata are dark red in colour and usually well demarcated from the brain, although sometimes the definition is not sharp. The consensus of opinion appears to be that they are true neoplasms. Nevertheless, because of the minute size of certain examples and their undoubted congenital origin, it may be impossible to distinguish them from malformations.

The positions in the hind brain in which hæmangioblastomata may arise are of the greatest importance from the point of view of surgical removal. Not uncommonly they originate in the neighbourhood of the cortex of one lateral lobe. Should a cyst then form in relation to the inferior surface of the cerebellum, its identification and the removal of the tumour may be simple. When the cyst is not large, and particularly if it is situated high on the superior surface in the neighbourhood of the quadrigeminal plate, it may readily be overlooked at operation. Again, a small tumour occurring in the region of the tonsils may be difficult to find. Complete removal of tumours which are more deeply situated and invade the fourth ventricle may present great difficulties. The uncommon example arising in the brain stem is best left alone.

On occasions a tumour originating in the neighbourhood of the fourth ventricle or from the tonsillar region may extend down into the spinal canal. The symptoms and signs may then be those of a highly placed tumour of the cervical cord. Neither Lindau nor Bailey and Cushing have encountered a true hæmangioblastoma above the *tentorium cerebelli*. Nevertheless the presence of such a tumour in Rochat's case[7] is undoubted; not only did a hæmangioblastoma occupy the basal half of the occipital and temporal lobes, but three separate tumours of the same type were found in the cerebellum. Furthermore, this patient belonged to a family in which other cases of Lindau's disease were known to have occurred.

Other cases have been reported, as that of Barnard and Walshe,[8] in which the histological appearances of a supratentorial tumour were identical with those of a hæmangioblastoma. Certain of these may be identified as meningiomata, as portions are typical of these tumours; nevertheless other tumours are entirely of an angiomatous structure and it may be surmised that they are meningiomata only by their apparent origin from the meninges and by the absence of invasion of the brain. It is thus likely that true hæmangioblastomata will be found on rare occasions situated above the tentorium.

Our six cases of cerebellar hæmangioblastoma will now be described. Afterwards the clinical course, diagnosis and management of such cases will be briefly discussed.

Reports of Cases.

CASE I.—A male, aged twenty-six years, single, was referred to one of us (L.B.C.) on March 6, 1935, by Dr. W. S. Newton. He had begun to suffer from severe headaches one year before. Previously he had experienced occasional milder headaches. The recent headaches were extremely severe and were located chiefly in the back of the neck and of the head. He said that he felt as if something was being pumped into the back of the head. Occasionally he vomited, with some relief. During a particularly severe attacks three months before he had vomited about half a teaspoonful of blood. One month later, after the removal of two infected teeth, any vertical line that he observed seemed to bulge in the middle. He also experienced neuralgic pains over the right half of his face, and numbness of his tongue. A little later papilloedema was found. Repeated neurological examinations by several observers failed to reveal any localizing signs of tumour. On the date of examination by one of us he complained that he felt as if his entire head was growing smaller and pressing on the brain. He felt extremely ill and for six days had been too weak to walk or stand. He had vomited all his meals for several days and felt continuously nauseated. His ears were constantly buzzing and both sides of his face felt numb. His family history disclosed no evidence of Lindau's disease.

On examination he was thin and ill. His intelligence was keen and highly developed, and he was an excellent witness. General examination revealed no abnormality. A high grade bilateral papilloedema was present, although the patient was able to read small print, and his visual fields did not appear reduced by rough tests. There was no objective disturbance of any cranial nerve, other than the optic nerves, despite his complaints of numbness of the face and of the extremities. It was not thought wise to subject him to vestibular tests. No nystagmus could be observed on repeated examinations. The movements of all limbs were weak, but equally so on the two sides; all coordinated movements were accurately, if weakly, carried out. Muscular tone appeared to be normal. No tremor was present. All tendon reflexes were active and equal on the two sides, except that the right knee jerk seemed more active than the left. The abdominal reflexes were equal and active; the plantar reflexes were flexor in type. All types of sensation were normal. The patient's speech was clear and coherent. Owing to his great weakness, gait and stance were not tested.

Ventriculography was carried out by one of us (H.C.T.). The ventricular fluid was under much increased pressure. Both lateral ventricles were greatly dilated, but the third ventricle was not visualized.

It was decided to explore the posterior fossa of the patient's skull.

The first operation (by H.C.T.) was undertaken on March 13, 1935, under nitrous oxide and oxygen anæsthesia; the intratracheal method was used. The cerebellar fossa was exposed in the usual way after a brain needle had been passed into the right lateral ventricle. The arch of the atlas was removed. When the *dura mater* was opened the cerebellar tonsils were seen to be well down through the *foramen magnum*, the right reaching the level of the arch of the atlas. Over the tip of the right tonsil there were several tiny thin-walled arachnoid cysts, containing clear fluid. The right tonsil was much larger than the left, and darker in colour, as though from a tumour just below the surface. A needle was inserted and a little deeply blood-stained fluid was withdrawn. A short incision disclosed the surface of a red vascular tumour. A small fragment was removed, and then, as the patient's condition at this stage was poor, the wound was closed.

The patient recovered well; but a few days after the operation cerebro-spinal fluid began to discharge from the wound. This ceased about twelve days after operation.

The second operation was performed on April 1, 1935; the wound was reopened on the right side and a space overlying the right lobe of the cerebellum and containing about two ounces of clear fluid was entered. An incision was made through the base of the right tonsil and adjacent cerebellum, exposing the surface of the tumour.

It was red, fleshy and extremely vascular, the main blood supply coming from the medial aspect, apparently from the posterior inferior cerebellar artery. The tumour was about the size of a small walnut. It was removed after a tedious dissection, during which hæmorrhage was most troublesome. Several largish vessels entered its lower medial pole. During the operation the patient was given a transfusion of blood and saline solution. He recovered well. Cerebro-spinal fluid discharged from the wound for a few days, but otherwise there were no complications. The patient was allowed up on the sixteenth day after operation.

After operation signs of cerebellar dysfunction were pronounced, including gross nystagmus, ataxia and dysmetria. By May 4, 1937, the patient was able to walk unsteadily, but unaided. He gradually improved and a few months later was able to play golf. He has remained well since and pursues an active business life.

CASE II.—A boy, aged seventeen years, was referred to one of us (L.B.C.) by Dr. R. G. McPhee on February 3, 1936. He was an extremely sturdy lad, weighing 82·6 kilograms (thirteen stone), who had had exemplary health until two weeks previously. While doing farm work he had become dizzy and vomited, but suffered no headache. This dizziness and vomiting increased in severity for seven days, when it was necessary to admit him to hospital.

The family history contained nothing of significance.

When first seen the patient was an unusually powerfully built boy, lying on his back, his head being constantly turned so that his right ear lay against the pillow. When he turned his head from this position projectile vomiting immediately occurred. He denied that he felt at all nauseated or that he suffered from any headache. His skin was flushed, and at every examination he was sweating profusely. He was intelligent and an excellent witness.

General systemic examination revealed no abnormality. No swelling of the optic disks was observed at repeated examinations extending over several days.

The cranial nerves were normal, with the exception of the eighth. No spontaneous nystagmus was observed, except that on one occasion a few vertical jerks upward were noticed. There was some difficulty in upward gaze. The hearing in both ears was normal (Dr. A. Blaubaum). No reaction could be obtained in either ear from the horizontal or vertical canals by cold stimulation (Dundas Grant coil) for two minutes. This test was repeated next day in the presence of one of us (L.B.C.) and the result was confirmed.

All movements were powerful and well coordinated. No tremor was present. Muscular tone was normal. No past pointing was observed. The deep reflexes were difficult to elicit, excepting the triceps and the ankle jerks, which were active and equal. The abdominal reflexes were equal and active, and the plantar reflexes were flexor in type. All forms of sensation were normal.

The gait and stance were not examined, as severe vomiting was induced by any change of position. The patient stated that he had staggered on walking. The head was constantly turned to the right while he was recumbent, and slightly flexed laterally in this direction. The body might or might not be rotated with it in the same direction.

The cerebro-spinal fluid was under a pressure of 270 millimetres of water; it contained no cells and was of normal chemical constitution.

X ray examination of the skull disclosed no abnormality.

The condition of the boy seemed to be serious. It was therefore decided, in view of the history of giddiness and vomiting without headache, together with the absence of vestibular responses, to explore the posterior fossa.

Operation (H.C.T.) was undertaken on February 10, 1936, under local anæsthesia. A cannula was passed into the left lateral ventricle through a burr hole made in the left occipital region of the skull. Cerebro-spinal fluid spurted out under high pressure. The cerebellum was exposed in the usual way. The tonsils were thrust downwards into the *foramen magnum*. The vermis was pushed over to the left side of the mid-line. The gyri of the right lobe were wider than normal, and yellowish in colour. An exploring needle was passed into the lobe and yellow fluid was encountered at a depth of half a centimetre. A transverse incision was made into the right cerebellar hemisphere, and a cavity, which was nearly five centimetres in diameter, was opened. The lining wall was smooth, white and glistening. The cavity crossed the mid-line, but its main bulk was on the right side. It was separated from the fourth ventricle by a thin septum. A small red mural tumour could now be seen projecting into the cyst a little above and to the

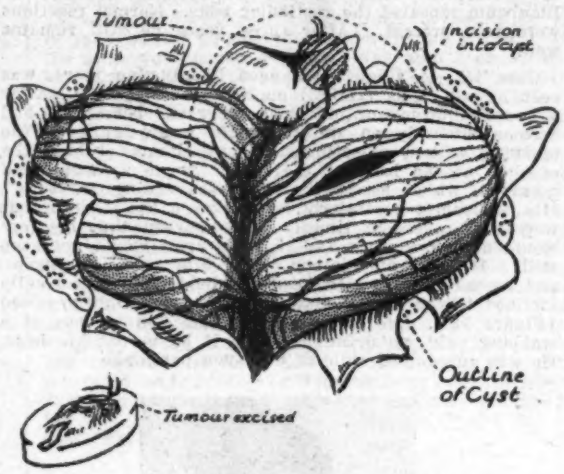

FIGURE I.

Sketch to show the appearance of the surface of the cerebellum exposed at operation in Case II. The tonsils are thrust downwards, the vermis is pushed over to the left of the mid-line, and the right lobe is bulging. The interrupted line shows the approximate outline of a large cyst associated with a small tumour, which could not be seen until the cyst was opened. Inset: The tumour removed in a disk of brain tissue cut from the wall of the cyst.

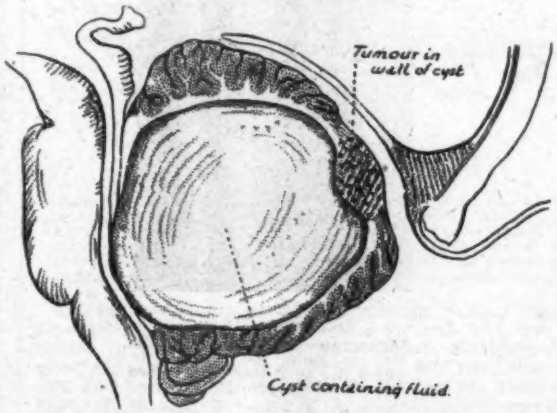

FIGURE II.

Diagrammatic representation of a sagittal section through the tumour (Case II) to show the relationship of the tumour to the tentorium and the large associated cyst.

right of the occipital protuberance. It was an easy matter, after evacuation of the cyst, to inspect the tentorial surface of the cerebellum. The tumour presented on this surface just to the right of the mid-line (Figures I and II). A large surface blood vessel entered it from below and a large vein left it above. These vessels were clipped and divided. A disk of tissue, including the tumour, was then excised with ease (Figure I). The

cavity was filled with saline solution and the wound was closed. The operation was completed in three and a half hours. The patient behaved splendidly and was returned to his room in excellent condition. During convalescence his temperature was elevated and did not return to normal for two weeks. Fluid was aspirated from under the flaps on several occasions. The patient left hospital on the twenty-second day after operation.

No signs of cerebellar disturbance occurred subsequent to the operation. Two months later he was in perfect health and could balance well on either foot with the eyes closed. Three months after operation Dr. A. Blaubaum repeated the vestibular tests. Normal reactions were now present. After three years he still remains well.

CASE III.—A single man, aged twenty-nine years, was seen by one of us (L.B.C.) on November 13, 1936. After a so-called attack of influenza six weeks before, he had become unsteady on walking. He would wake in the morning with a pulsating headache situated behind the eyes or at the back of the head. Some vomiting had occurred, which he attributed to the taking of "salts". His headaches, he thought, were now a little better, but were still severe at times. He remarked that his legs would not go straight and that his arms would not keep still. He was ambulatory when first seen, intelligent, and a good witness. His head was held stiffly and usually inclined to the right shoulder, which was slightly raised (Figure III). He attributed this position to fear of a stabbing pain which might occur if he moved his head. He was an adopted child of unknown parentage.

FIGURE III.
Photograph of patient (Case III) to show the attitude in which the head was held before operation.

General examination revealed no abnormality. No swelling was observed in the optic disks when the patient was first seen; seven days later, prior to operation, slight swelling was observed.

Examination of the cranial nerves gave the following information. The left pupil was always more widely dilated than the right; both reacted to light and to accommodation, but very sluggishly. No nystagmus was observed on the first examination, but later gross lateral nystagmus developed, of equal intensity on each side. The cranial nerves were otherwise normal.

The patient showed a pronounced coarse intention tremor of the left arm. Coordinated movements of the left upper limb were poorly performed. The left lower limb was relatively less affected, and no tremor on movement was present. Rapid alternating movements, however, were poorly performed. The gait and stance were fair. The tendon reflexes of the arms were elicited with difficulty; those of the legs were equal and active. The abdominal reflexes were equal and active; the plantar reflexes were flexor in type. Power was equal on the two sides; there was no detectable hypotonia. All types of sensation were normal.

While in hospital the patient developed intense agonizing headache. His cerebro-spinal fluid, shortly after the attack, was under a pressure of more than 400 millimetres of water. Only a small amount was withdrawn. The cells and chemical constituents were normal and the fluid failed to yield the Wassermann reaction.

A skiagraph of the skull revealed no abnormality. Hearing and vestibular reactions were normal.

Operation was undertaken on November 21, 1936, under nitrous oxide and oxygen anæsthesia induced by the intratracheal method was used. Saline solution was administered subcutaneously throughout by the continuous drip method. A cannula was passed into the left lateral ventricle through a drill hole in the left occipital region; cerebro-spinal fluid spurted out under high pressure. The *dura mater* of the cerebellar fossa was exposed in the usual way. Enlarged veins were encountered issuing from the skull. When the *dura mater* was opened the vermis was seen to be pushed a little to the right of the mid-line, and the left lobe of the cerebellum bulged slightly (Figure IV). An exploratory needle was passed into it and a little blood-stained fluid was aspirated at a depth of three centimetres. An incision was made into the lobe and the surface of a tumour was exposed. It was dark red in colour and its surface was smooth. When its fluid contents were evacuated the wall of the

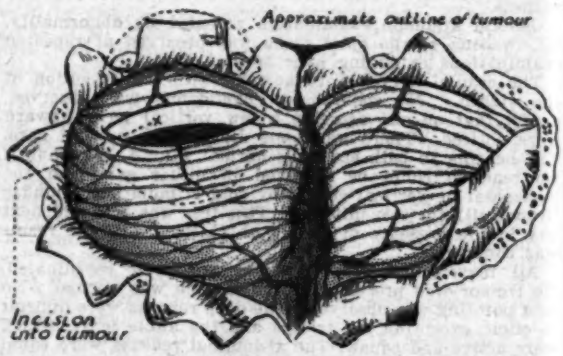

FIGURE IV.
Sketch to show the appearance of the brain as seen at operation (Case III). The left lobe is bulging, the vermis is pushed over to the right of the mid-line, and the tonsils are herniated into the *foramen magnum*. The interrupted line gives the approximate outline of a deeply situated tumour, which was removed after the brain had been incised as shown.

cyst could be separated from the surrounding brain and gradually removed piecemeal. The cyst wall was soft and friable, smooth on the outer surface, ragged on the inner. Troublesome oozing of blood and the depth of the tumour made removal tedious. The tumour abutted upon the tentorium (Figure V), so that after its removal there was a tunnel right through the lobe from the inferior to the tentorial surface. The wound was closed in layers *secundum artem*. The operation was completed in five and a half hours. A transfusion of blood was given during the later stages. The patient recovered consciousness in a few minutes. He was allowed up on the thirteenth day, after an uneventful convalescence.

One month after operation the patient could balance well on either foot with the eyes open. The incoordination of the left upper limb was much decreased, and the degree of tremor was now small. No nystagmus was present. Five months after operation he began to

experience giddiness when he lay upon his left side. Despite this, he stated that the capacity to use his left arm was still improving. His vestibular reactions were normal. Writing ten months after operation, he stated that he could still not lie upon his left side, but was otherwise very well. His left arm was still a little unreliable. In June, 1939, he wrote to say that he was very well and able to carry on his business.

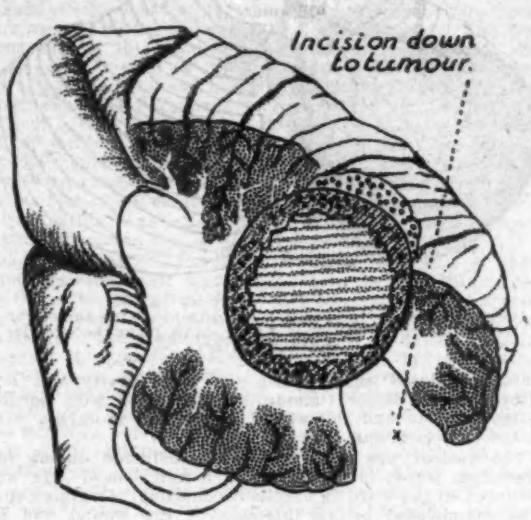

FIGURE V.

Diagram to show the position of the tumour (Case III) as estimated at operation. The tumour abutted on the tentorium, but was approached from the exposed inferior surface of the cerebellum after incision of the brain, and removed.

CASE IV.—A married man, aged fifty-five years, referred to one of us (L.B.C.) by Dr. A. Barrett on June 7, 1937, had had excellent health until six months before. He then began to suffer from severe headaches, which had become worse lately. He had travelled, hoping for relief; but the headaches had continued. The headaches had been at first at the back of the head, but later were chiefly frontal. They had been associated with giddiness, and in these attacks he stated that he lost some control of his legs. His wife said that he was now very forgetful and dull and seemed an altered man. During the more severe headaches his confusion was great. He had had many vomiting attacks, in one of which he had vomited blood. He complained of stiffness of the back of the neck and a tightness on turning his head. He had had several attacks of unconsciousness, in one of which he had fallen to the ground. There was no family history of Lindau's disease.

On examination he appeared a well-nourished man and at times was forgetful and confused. Pronounced photophobia was present. General examination revealed no abnormality.

The radiographic appearance of his skull was normal; a little irregularity of the mucous membrane of the pyloric antrum was noted after a barium meal.

Pronounced bilateral papilloedema with hæmorrhages was present. No other abnormality of the cranial nerves was detected. No nystagmus, muscular incoordination, loss of power or alteration in tone was observed. The tendon reflexes were active and equal; the abdominal reflexes were active and equal; the plantar reflexes were usually flexor, but at times the great toes extended. The patient was unsteady on standing. Sensation of all types was normal. The cerebro-spinal fluid pressure was raised to 250 millimetres of water. The constituents of the fluid were chemically and microscopically normal, and there was no response to the Wassermann test.

At operation (H.C.T.) on June 12, 1937, under local anæsthesia, burr holes were made in the skull over the occipital poles. On June 19, 1937, brain-exploring needles were introduced through these openings into the lateral ventricles. The cerebro-spinal fluid pressure was much higher than normal, but was not measured. About 90 cubic centimetres were removed and replaced by oxygen. Skiagrams showed that the lateral and third ventricles were much dilated. Operation was immediately undertaken; nitrous oxide and oxygen anæsthesia was induced by the endotracheal method. A cannula was introduced into the right ventricle and left *in situ* throughout the operation. Gas and cerebro-spinal fluid escaped. The *dura mater* was exposed without difficulty and found to be rather tense in spite of the tapping of the ventricular system. When the dura was opened a tumour was seen high up in the left lobe of the cerebellum (Figure VI). The cerebellum bulged rather more than normally into the wound. The tonsils were herniated into the *foramen magnum*. Several large vessels coursing over the tumour were coagulated and the tumour was removed after a small amount of the overlapping cerebellum had been cut away. The growth was dark red in colour, with a smooth, well-defined surface. It was soft, friable and moderately vascular. In its greatest diameter it measured about three centimetres. The cerebellum still appeared to be rather bulky, but no second tumour could be found. Dye injected into the lateral ventricle promptly appeared in the *cisterna magna*, proving that there was now no hindrance to the flow of cerebro-spinal fluid into the cerebellar fossa. The wound was then closed in layers with waxed silk. The operation was concluded in three and a half hours. The patient recovered consciousness in a few minutes and was returned to bed in excellent condition. Convalescence was uneventful, the patient being allowed up on the twelfth day after operation.

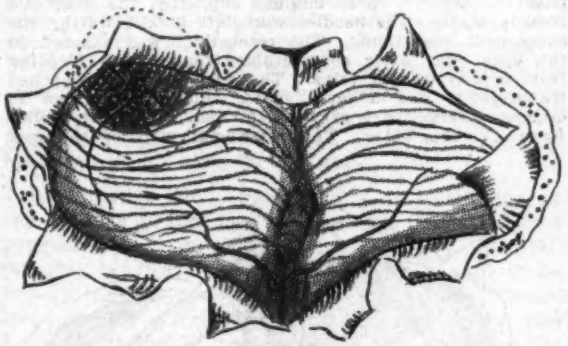

FIGURE VI.

Sketch to show the appearance of the cerebellum as exposed at operation in Case IV. A tumour was seen situated high up in the lateral part of the left lobe. The interrupted line gives approximately the outline of the deeper part of the mass. The vermis is displaced to the right, the tonsils are depressed and the left lobe in general bulges abnormally.

He improved steadily after operation. Four months later he was steady when standing on both feet, but was unable to balance on either foot alone. He showed no other signs of cerebellar dysfunction. His neck was still stiff and he had some difficulty in turning his head. As, however, he had developed a rheumatoid condition of the left shoulder, with considerable limitation of movement, it is possible that the stiffness of his neck might have been due to spondylitis. He stated that since operation he had had to place his head forward to swallow properly. When he was last seen, in April, 1939, his health was excellent.

CASE V.—A man, aged twenty-nine years, attending the out-patient department of the Alfred Hospital, complained of headaches, mainly occipital and in the back of the neck. These were constant and sharp, and severe after exertion. At first they were particularly severe and he would often vomit. Recently they had become localized in the left

side of the neck. Four months before examination he had noticed that he could not walk straight and would stagger to either side as if intoxicated. This unsteadiness had become worse. There was no family history of Lindau's disease.

A general examination revealed no abnormality.

Early papilloedema was present. There was no observable paresis of any ocular muscle, although at times the patient complained of double vision on lateral gaze. Nystagmus was present—coarse on looking to the right, fine on looking to the left. Otherwise the cranial nerves were normal.

The tendon reflexes were active and equal, except the tricipital jerks, which were sluggish. The superficial abdominal reflexes were equal and active; the plantar reflexes were flexor. Coordinated movements were fairly well performed on the right side, but poorly on the left. All types of sensation were normal. The gait was ataxic and the speech slurred.

The cerebro-spinal fluid was of a pale yellow colour and contained 0·18% protein. The Wassermann reaction was not elicited and the gold curve was normal. The number of cells was not increased. The pressure of the fluid, when the patient was in the horizontal position, was 380 millimetres of water.

The visual fields were normal, except that the left field was slightly contracted.

On X ray examination the skull appeared to be normal.

A diagnosis of left-sided cerebellar tumour was made.

Operation was undertaken on September 29, 1936, under nitrous oxide and oxygen anæsthesia, given by the endotracheal method. Burr holes were made over the occipital poles and brain needles were introduced into the lateral ventricles. Cerebro-spinal fluid was encountered at a pressure of more than 300 millimetres. A small amount of air injected into one ventricle was recovered from the other. These findings supported the diagnosis already made. The needles were left *in situ* during the subsequent operations. The cerebellum was exposed in the usual way after considerable trouble with bleeding from greatly dilated veins. The *dura mater* was opened transversely, and a large cystic tumour was seen to occupy a large part of the left side of the cerebellar fossa (Figure VII). The superficial wall of the cyst

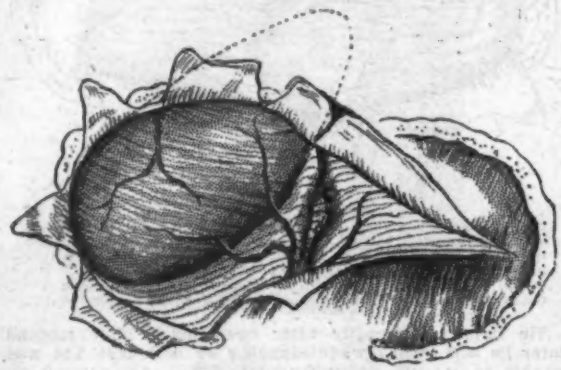

FIGURE VII.

Sketch to show the appearance of the cerebellum (Case V) as seen at operation. A large cystic tumour occupies a great part of the left half of the cerebellar fossa, displacing the left lobe downwards and to the right. The interrupted line shows approximately the extent of the tumour beneath the tentorium, which was not visible until later in the operation.

was thin and ruptured spontaneously, so that the contained fluid could not be collected. It appeared to be stained with old blood. The left lobe of the cerebellum was displaced downwards and medially by the tumour. Veins passing from the tumour to the transverse sinus and to the surrounding cerebellum were coagulated and divided. The tumour was soft and degenerated in great part. With the endothermy loop it was cut away from the surrounding brain, which was stained apparently as a result of recent hæmorrhage. The tumour extended upwards and medially under the tentorium almost to the culmen of the monticulus. In this region branches from the superior cerebellar artery entered the growth (Figure VIII). These

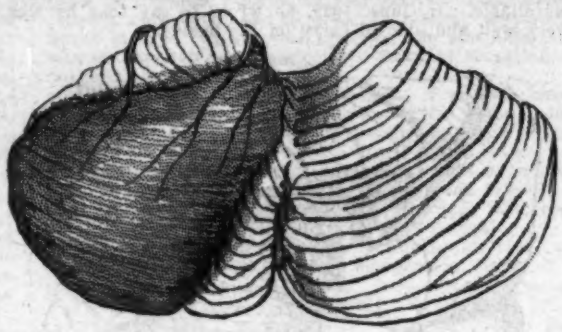

FIGURE VIII.

Diagram to show the position and extent of the tumour in Case V. Part of the blood supply came from the superior cerebellar artery.

were coagulated and divided. A huge cavity was left after removal of the tumour. It was filled with normal saline solution and the wound was closed in layers with waxed silk *secundum artem*.

The patient was given a blood transfusion during the operation, which lasted four and a half hours. He was returned to the ward in excellent condition. Convalescence was complicated by an infection of the wound and by meningitis. *Bacillus welchii* was found in the cerebro-spinal fluid obtained by lumbar puncture on October 4, 1936, and again on October 8, 1936. Gas gangrene antiserum was given in large doses. The patient became very ill, but eventually improved and left hospital on October 29, 1936.

His general health has remained consistently good since operation, but he is still awkward in his movements and cannot hold his place in the labour market. Nystagmus, most pronounced when he looks to the left, is still present, and the left leg and arm are still incoordinate. He can walk without a stick, but prefers to use one, as he occasionally lurches, and he is sensitive of appearing to be drunk.

CASE VI.—A married woman, aged thirty-seven years, was transferred to the Alfred Hospital from the Geelong Hospital on June 16, 1938. For two years she had noted pains behind the eyes on reading, but had obtained some relief by using glasses. Nine months before admission to hospital she had developed acute bronchitis. After this her headaches occurred daily and were more persistent. They had become much more severe for several months before admission, and in addition to a throbbing pain behind the eyes she suffered from severe stabbing pains in the left occipital region, shooting up to the vertex. For several months she had noticed giddiness, particularly on turning to the left. On turning quickly once she had fallen into a clothes basket. She was either confused or lost consciousness momentarily in these attacks. For the last ten weeks she had become very giddy if she bent forwards. She had been unsteady for some time, especially in the dark, when she would sway to the left. She described herself as a light but persistent drinker; she was considered by one medical attendant to be alcoholic. She had five children, active and well. There was no history of Lindau's disease in her family. One brother had been in a mental hospital since the War.

On examination she was seen to be a well-nourished woman. General examination revealed no significant abnormality. Her systolic blood pressure was 155 millimetres of mercury, her diastolic pressure 100 millimetres.

The optic disks were normal. The patient showed a pronounced lateral nystagmus, rapid to the right, coarse and slow to the left. Upwards vertical nystagmus was

present. All other cranial nerves were normal. Both cochlear and vestibular divisions were intact. The left arm was hypotonic. The tone in the other limbs was normal. Power was good. Coordination was fair, as shown by ordinary tests. Rapid alternating movements were well performed. The extended left arm oscillated more than the right on displacement. She was unsteady and deviated to the left on walking. She could stand steadily with the feet together when the eyes were open, but swayed to the left when they were closed. She was conscious of this tendency. All reflexes, superficial and deep, were normal in type. All forms of sensation were normal. The neck was held stiffly, at times the head being inclined slightly towards the left shoulder, which was raised. The cerebro-spinal fluid was under a pressure of 150 millimetres of water; the total protein content was 0·06%; globulin was present. There was no response to the Wassermann test and the gold curve was normal. An X ray film of the skull was of normal appearance.

The patient was considered to have a cerebellar tumour, mainly involving the left lobe.

Operation (H.C.T.) was undertaken on August 5, 1938, under nitrous oxide and oxygen anæsthesia administered by the endotracheal method. The cerebellum was exposed in the usual way, after tapping of the right lateral ventricle. The right lobe was seen to bulge abnormally, its gyri being widened and the tonsil on that side being much larger than normal and projecting downwards through the *foramen magnum*. The vermis was displaced to the left of the mid-line. A brain needle was passed into the left lobe and about 15 cubic centimetres of yellowish fluid were aspirated. This coagulated on standing. An incision was made into the lobe a little above the base of the tonsil and a large cyst was opened. The cyst contained perhaps 50 cubic centimetres of fluid. Its wall was smooth and shining. It occupied a great part of the right half of the cerebellar fossa. A dark red nubbin of tumour projected into the cyst in the region just posterior and lateral to the jugular foramen. It could also be seen from the outer surface after the collapsed tonsil was extricated from the *foramen magnum* and the lobe elevated. Removal was a little difficult because of the proximity of the tumour to the nerves and vessels entering the jugular foramen, but eventually a clean excision was effected. The wound was closed *secundum artem*. The operation was completed in a little over three hours. The patient recovered consciousness in a few minutes.

Convalescence was uneventful, except for difficulty in swallowing, due to weakness of the right side of the palate. This difficulty gradually disappeared. The patient was allowed up three weeks after operation.

Discussion.

The general signs and symptoms of cerebellar tumour are too well known to merit discussion in a paper designed to further the study of one particular variety. We may therefore seek for anything distinctive in the life history of these hæmangioblastomata without discussing the signs of disturbance of the cerebellum in general, for they produce no signs or symptoms which other varieties of tumours occurring in this situation do not produce. Do they give rise to any peculiar clinical features whereby they may be differentiated from other types of cerebellar tumour?

In the occasional case in which signs of cerebellar disturbance occur in association with a retinal hæmangioblastoma, or in a member of a family in which Lindau's or von Hippel's disease is prevalent, a diagnosis of hæmangioblastoma may be made with confidence. In no case in this series was a history of familial Lindau's disease obtained or retinal hæmangiomatosis demonstrated; and this has been so in many other similar small groups.

Although these tumours almost certainly arise during fœtal life or in very early infancy, they do not usually declare themselves before adult life, the average age at the onset of symptoms being from 30 to 35 years (Bailey[9]). The ages of the patients in the present series at the time of onset of symptoms were 17, 25, 29, 29, 35 and 55 years respectively. Hæmangiomata may, however, be met with in childhood; Dandy reported one in a baby aged one month.

The age of the patient at the time of the onset of signs of cerebellar embarrassment is therefore of some significance. Indeed Bailey writes that "the diagnosis of the hæmangiomatous cyst of the cerebellum must be made principally from the acoustic neuroma, the only common tumour in the subtentorial region of adults". This statement cannot be entirely accepted for this country, as will be realized when the following facts are considered. Of nine histologically confirmed intracerebellar tumours in adults encountered by us since March, 1935, six were hæmangioblastomata. The remaining three included a carcinoma, an astrocytoma and a medulloblastoma. Thus far the facts seem to support Bailey's contention; but before March, 1935, there were fourteen cases of intracerebellar tumour in adults with no example of hæmangioblastoma. The fourteen tumours comprised five astrocytomata, four medulloblastomata, two ependymomata, two carcinomata and one growth of doubtful nature. Thus of a total of twenty-three intracerebellar tumours in adults, six were hæmangiomatous in nature, or roughly one in four. Astrocytomata have been encountered just as often, and medulloblastomata only slightly less frequently.

Intermittency of symptoms and, in particular, of the attacks of headache, had been thought to be suggestive of the hæmangioblastomata,[10] and, possibly because of this, papillœdema is said to be late in making its appearance. This intermittency has not been notable in our cases, and indeed has been much more common with the cystic astrocytomata. Such a remission of symptoms, although particularly common with any cystic tumour of the cerebellum, is in our experience by no means uncommon with tumours of the solid type. Thus it was particularly pronounced in the case of one man, aged twenty-seven years, afflicted with a cerebellar medulloblastoma, and in that of a woman, aged thirty-four years, whose cerebellum contained a large secondary carcinoma. In our experience of twenty-three cases of intracerebellar tumours in adults, intermittency of symptoms has not helped in the diagnosis of the type of tumour.

The late appearance of signs of cerebellar embarrassment has been held to be of diagnostic significance. Significant signs of cerebellar disturbance were present in only three of our cases prior to operation. In Cases I and V, in which the history was of one year's and of six months' duration respectively, these signs could never be obtained prior to operation; in Case II, with a

clinical history of six weeks' duration, unsteadiness occurred with the headaches; and in Case IV, with a clinical history extending over nine months, unsteadiness of gait did not occur till five months after the onset of the headache. Furthermore, with many of our gliomatous tumours the headaches long preceded the onset of symptoms and signs of cerebellar disease, while with others such signs and symptoms were lacking throughout the entire course.

It has therefore seemed to us that, failing the discovery of a hæmangioblastoma of the retina, and in the absence of a family history of Lindau's or von Hippel's disease, it is impossible to predict with any certainty that any particular cerebellar tumour is of the nature of a hæmangioblastoma. Nevertheless it should be borne in mind that a tumour occurring in the cerebellum of any adult will not uncommonly be found to be of that type. In our series of such tumours one in every four was a hæmangioma.

Should a hæmangioblastoma involve the cranial nerves of the cerebello-pontine recess of one side, it might simulate the common acoustic nerve tumour. In none of our cases did the signs and symptoms support a diagnosis of acoustic tumour, and the cranial nerves were not involved to any notable extent. This has, however, occurred in tumours reported by others.

In the diagnosis, highly placed spinal tumours must also be considered. The less common tumour of the fourth ventricle, be it a hæmangioblastoma or a glioma, may grow through the *foramen magnum* and compress the bulb and upper part of the spinal cord. The signs may then resemble those of a highly placed primary spinal tumour. It is perhaps sufficient to remember that, where signs indicative of such a tumour of the cord are present, the compressing mass may be but a downward extension of a growth in the cerebellar fossa. This must, of course, be borne in mind when operation in such a case is to be undertaken.

When the signs of cerebellar disease are indefinite, as in our Cases I, II and IV, ventriculography may be essential in determination of the situation of the tumour. It was of decisive value in Cases I and IV.

Signs indicative of cerebellar disease may not be readily elicited. These are frequently lacking with many other types of cerebellar tumour. Furthermore, the patient may be so ill, owing to the raised intracranial pressure or to the effects of continuous vomiting, that some doubt may be felt as to the significance of less obvious disorders in motility. Here the early history may suggest the site of the disorder, for disturbance in gait may be complained of, although little can be demonstrated at examination. In Case II the site of the lesion was suggested by the history of giddiness and vomiting and by the absence of headache or nausea. Some confirmation of the site of the disturbance was obtained from the absence of response to vestibular stimulation with the Dundas Grant coil. That this depression of vestibular function was related to the presence of the tumour seems certain, for normal responses were obtained some months after its removal. It is of interest to note that hypo-excitability of the vertical canals was noted in one example of hæmangioblastoma of the cerebellum reported by Lereboullet.[11] Nevertheless, diminished or absent vestibular reactions are found in only a small percentage of cerebellar tumours and have no relation to the histological type. According to Fanner,[12] hyperactive or normal responses are more common with tumours in this situation.

Summary.

From this section of the paper we may draw certain conclusions:

1. In a series of six cases of hæmangioblastoma of the cerebellum the clinical features were not such as to permit of a diagnosis before operation of hæmangioblastoma rather than other types of tumour.

2. When in an adult patient there is evidence of the presence of a tumour in the cerebellum, the tumour will frequently be a hæmangioma. In our series of twenty-three cases of intracerebellar tumours in adults, six were hæmangiomata.

3. Hæmangiomata are benign and should be removed if possible. All of our patients are alive and well after removal of the tumours.

Hæmangioblastomata of the Spinal Cord.

It has been pointed out that when the spinal cords of patients suffering from Lindau's disease have been examined at autopsy a spinal hæmangioma has frequently been found. Yet, clinically, evidence of such an association is seldom found. Indeed the number of examples of hæmangioblastoma of the spinal cord as yet reported is well under twenty; Davison, Brock and Dyke[13] found only twelve cases recorded in the literature up till 1936.

Extradural and vertebral examples of hæmangioma were collected by Globus and Doshay[14] and will not be considered here.

The subdivision into hæmangioblastomata and angiomatous malformations may be extended to the vascular anomalies of the spinal cord; but one important reservation must be made by the operating surgeon. On at least two occasions a spinal hæmangioblastoma has been found in association with grossly enlarged and tortuous intradural vessels.[13][15] It must therefore be remembered that an apparently simple vascular malformation of this type, encountered at operation upon a patient showing the signs of disturbance of function of the spinal cord, may be associated with a more deeply placed hæmangioblastoma or with some other type of intramedullary tumour.

Spinal hæmangioblastomata commonly arise within the cord dorsal to the site of the spinal canal and in the neighbourhood of the dorsal septum. It is not uncommon also to find an associated syringomyelic cavity.[16][17] Such a cavity might render the diagnosis of the exact site of the tumour

difficult. These tumours are by no means always associated with hæmangioblastomata elsewhere, and may exist alone. They may then cause such signs and symptoms as do other intraspinal growths. A hæmangioblastoma involving the spinal cordd has been encountered by one of us (H.C.T.) in the lumbar region of the spinal canal.

Reports of Cases.

CASE VII.—M.D., a single woman, aged twenty-six years, was admitted to the Austin Hospital on January 10, 1934. In the year 1923 she had been thrown from a horse and had sustained injuries which, however, were not of great severity. She was not confined to bed. Three months later she experienced pain in the small of the back and began to lose weight. Gradually she lost power in the lower limbs until she could not walk without help. For some years before admission to hospital she had got about in a wheeled chair. Except for cramp in the lower limbs she had not experienced much pain. Micturition and defæcation were practically normal.

On admission to hospital the patient was thin; but her general health was fair. There was an advanced degree of kyphoscoliosis of the spine, the apex of the deformity being in the lumbar region. Both lower limbs were very wasted, but could be raised voluntarily from the bed with the knees extended. There was very little power in the muscles below the knee joints, but some slight power of flexion and extension remained at the right ankle joint, and of plantar flexion at the left. The adductors of the thighs contracted fairly well. The hamstrings on the left side were very weak, on the right somewhat stronger. Electrical stimulation of the various muscles and nerves of the lower limbs disclosed a patchy loss of response, more widespread on the left side. Pinpoint was appreciated down to the level of the fourth lumbar dermatome on each side. In the feet, deep pressure was not appreciated and the sense of movement and position was lost. The knee jerks, ankle jerks and plantar reflexes were not elicited. The urine contained much pus, but the bladder functioned almost normally.

Operation was undertaken on July 11, 1934. A long incision was made over the lumbar spines. The subcutaneous tissues were very vascular and hæmorrhage was troublesome. The spines of the vertebræ over the apex of the gibbus had almost disappeared, apparently as a result of pressure—pressure of the growth from in front and of the bed from behind. Most of the arches of the vertebræ were much expanded and thinned out by the underlying tumour. In places, however, the laminæ had withstood the pressure of the tumour and persisted as transverse bars of bone deeply indenting its surface. Between these bars the tumour bulged dorsally and was covered by many thinned and expanded laminæ and ligaments. These were removed. The tumour extended from the twelfth dorsal vertebra to the upper border of the sacrum. It varied greatly in diameter, being in places quite five centimetres across from side to side, and almost as much in an antero-posterior diameter. After removal of the tumour it was seen that the bodies of the vertebræ had been deeply excavated by it, whilst the intervening disks had suffered comparatively little (Figure IX). The excavations in the bodies were quite smooth and covered by a layer of fibrous tissue. The arch of the fifth lumbar vertebra was not much expanded, but the canal was filled by a process of the growth.

The tumour was dark red in colour, rather firm and fleshy in consistency, and moderately vascular. It was covered by a thin capsule. No nerves were seen in its dorsal surface. It was removed piecemeal. Some nerves were found embedded in its deeper parts, and some at least were damaged during the removal. There was no collection of nerves to be seen at all resembling the normal *cauda equina*. Some strands lay between the growth and the vertebral bodies, but probably others had been so flattened and distorted as to be unrecognizable. Prolongations of the tumour passed through some of the intervertebral foramina. At its upper end the tumour abutted on the dural sac, which was obliterated below this level. The vertebral canal was expanded to the greatest degree, and destruction of the bodies was most advanced in the region of the first, second and third lumbar vertebræ. Probably the tumour originated at the level of the second lumbar vertebra. The fact that some few of the nerves of the *cauda equina* were embedded in the tumour would seem to indicate that it arose within the theca.

Because of the great size of the tumour and the distortion of the tissues it was not possible to determine its relations with any certainty. The nerves of the *cauda equina* seemed to lie mainly anterior to the growth, being flattened by it against the vertebral bodies and intervening disks. The meninges were not recognizable below the twelfth dorsal vertebra. The *conus medullaris* was not identified. It must have been compressed between the growth and the vertebral bodies, in the upper part of the operative field.

The operation was terminated before the lower extremity of the tumour had been removed, on account of the state of the patient.

On October 24, 1934, the lower part of the wound was reopened and the remains of the growth were removed.

The patient recovered well from the operations. Power in the lower limbs has not improved, but some recovery of sensation has occurred, particularly in some of the sacral dermatomes. Incontinence of urine and fæces was present soon after operation; this was replaced later by automatic voiding.

Angiomatous Malformations.

Cushing and Bailey subdivide the angiomatous malformations of the central nervous system into three groups. The first group of capillary telangiectatic malformations is of little importance. They are frequently multiple and rarely produce symptoms. The other two groups, that of the *angioma venosum* and of the *angioma arteriole*, are more important.

The *angioma venosum* is a malformation composed chiefly of vessels resembling veins. It may be found situated superficially in the cortex of the cerebral hemispheres, or occasionally in the hind brain or in the spinal cord. It is probably a malformation of the meninges and is of great interest because of its well-known association with cutaneous nævi in the trigeminal areas and elsewhere. These nævi may occur on the same side and in the same body segment as that of the meningeal lesion. Thus a trigeminal nævus or "port wine stain" may be associated with a cortical angioma of the same side, or one of the neck or body segments with a medullary or spinal angioma.[18] In addition to the association of a "port wine stain" with cortical angiomatosis, other conditions suggesting a widespread defect in development may be observed. At times unilateral buphthalmos, or glaucoma, or abnormal branching and tortuosity of the retinal vessels will be found. One characteristic clinical syndrome is the association of angiomatosis of the pia, perhaps calcified and visible in the skiagraph, with "port wine" staining of the face and unilateral buphthalmos or glaucoma.

Such a case, although visible calcification is not found in the skiagraph, has been under our observation for some time.

Reports of Cases.

CASE VIII.—T.C., a single woman, aged thirty-eight years, was first seen by one of us (L.B.C.) on May 28, 1932. She has been under observation ever since. She had suffered from epilepsy since childhood, and had often fallen on the street. No clear description of her attacks was forthcoming, but in them she had frequently bitten her tongue. She now states that she has had no attack since 1934. She is under treatment with phenobarbital. She is of poor mentality, could not learn at school, and is said to be very difficult in her home life. She has complained of failing vision for some years. Dr. J. Ringland Anderson had found a glaucomatous cup in the right eye associated with a pronounced reduction of vision, and operated for the relief of this condition in 1933. The left eye appears to be normal. Since attending hospital she has constantly complained of attacks of giddiness, of bumping into objects, of distressed breathing, and of severe headaches. Owing to her poor mentality it is difficult to gauge the severity of her symptoms; moreover, she is extremely suggestible mentally.

She has three healthy brothers and one healthy sister. Another sister, now aged fifty-three years, is said to be in a home and to be violent on occasions.

On examination the patient appears moderately well nourished. She is a poor witness and bitterly complains of her symptoms and the lack of sympathy of her family. Her intelligence is that of a child.

An extensive cutaneous angioma is present over both sides of the face, extending well down onto her neck and chest. The palate and the mucous membrane of the cheeks are also involved. Patches are also present over both arms, legs and ankles (Figure X).

FIGURE X.
Photograph of a woman (Case VIII) to show extensive cutaneous angiomata of the face, neck and chest.

The general systemic examination reveals no abnormality; the systolic blood pressure is about 130 millimetres of mercury.

The cranial nerves are normal. The patient's deep reflexes are all extremely active, but equal; the superficial abdominal reflexes have at no time been obtained. In 1932 it was noted that the great toes were held in the extensor position and that a definite right extensor response was present. Now both plantar reflexes are extensor in type, with slight fanning of the toes of the left foot. On occasions certain of the tests for coordinated movements have been poorly performed; these results have been capricious, and it has been considered that they are more the result of a functional condition. Power is fairly good. Cortical sensation is always normal.

A radiological examination of her cranium revealed no pial calcification.

The patient's condition has progressed little, if at all. She therefore presents the typical syndrome of cutaneous angiomatosis, glaucoma, epilepsy, mental impairment, and neurological signs indicating organic disease of the pyramidal tracts. It may be reasonably inferred that she suffers from cerebral angiomatosis.

Discussion.

The operative treatment of the cerebral *angioma venosum* has not been found by Cushing and Bailey to be satisfactory. Nevertheless, Sachs[19] reports several satisfactory removals from the cerebral cortex, and Dandy has described the removal of the analogous condition from the spinal *pia mater*. He remarks that the abnormal vessels may be readily unravelled and removed from this situation. It has not seemed to us in the interest of our patient to undertake exploration of her cortex, as it was difficult to see what benefit would be forthcoming.

One of us (H.C.T.) has, however, encountered and removed an atrophied or undeveloped area of cortex associated with large dilated and tortuous vessels from an adult male who had suffered from epilepsy and hemiparesis since birth. The case has been recorded in detail by Dr. E. Graeme Robertson.[20]

The cortical *angioma arteriole*, according to Cushing and Bailey, is a more serious disorder. Here an anastomosis between arteries and veins exists, with the production of a large pulsating mass frequently giving rise to an audible bruit. Unilateral exophthalmos is often present, a choked disk is common, and arterial blood may be observed within the veins on retinoscopy. Such a formidable mass may readily be associated with epileptiform attacks, local or general. The vessels of the scalp over it may be considerably enlarged, a phenomenon by no means peculiar to these malformations. The angioma frequently extends from the pia deeply into the brain. The condition is said to be relieved by such measures as decompression, radiation therapy and the ligation of the carotid artery of the affected side.

These two latter malformations, described by Cushing and Bailey, appear to arise in and extend from the pia. Russell[21] has described a different malformation or tumour, of a type which these authors have not observed. Of 19 blood vessel "tumours" of the central nervous system encountered in the pathological laboratories of the London Hospital, no less than seven were cavernous hæmangiomata of the white matter of the cerebral hemispheres or of the basal ganglia. They were large, lobulated or mulberry-like masses, having no anatomical connexion with the meninges. We have encountered no example of the arterial angioma or of the type described by Russell.

ILLUSTRATIONS TO THE ARTICLE BY DR. KEITH SMITH.

FIGURE I

Thoracic disease, antero-posterior view; typical fusiform abscess.

FIGURE II.

The same patient as in Figure I, lateral view, showing characteristic anterior cupping of the vertebral bodies due to mechanical (non-tuberculous) erosion by the abscess.

FIGURE III.

Skiagram showing two separate lesions, globular type of abscess above and psoas abscess below.

FIGURE IV.

Skiagram from a case of lumbar disease, showing a perfect end-result.

ILLUSTRATION TO THE ARTICLE BY Dr. LEONARD B. COX AND Dr. HUGH C. TRUMBLE.

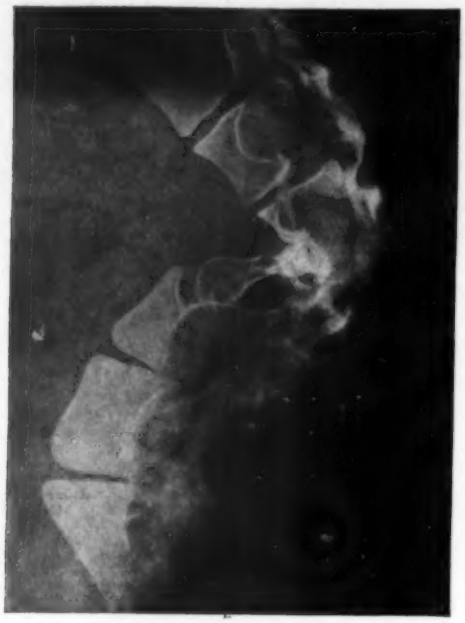

FIGURE IX.

Skiagraph of the spine of a woman (Case VII) to show the extensive changes produced by a massive hæmangioblastoma growing in the vertebral canal in the lumbar region.

ILLUSTRATIONS TO THE ARTICLE BY Dr. M. P. SUSMAN.

FIGURE I.

Longitudinal section of the lower lobe of the left lung, showing advanced bronchiectasis.

FIGURE II.

Bronchogram, lateral view, showing the basal bronchiectasis.

Vascular Malformations of the Spinal Cord.

Vascular malformations of the spinal cord have been divided by Globus and Doshay[14] into venous dilatations and arterial or arterio-venous aneurysms. They collected all available cases published up to 1929 and added new cases.

It is of interest to observe that these venous dilatations have been considered as being by no means rare. Thus Kadyi,[22] in 1889, found various degrees and several types of varix in the spinal cord veins of eight out of twenty-six cords examined.

The venous anomalies have been further subdivided by Benda[23] into phlebectasias (diffuse widening of the lumina of the veins), varicosities (diffuse irregular dilatations with circumscribed ampullar or sac-like formations), and venous angiomata, in which a circumscribed conglomeration of dilated veins occurs.

In a consideration of the question whether the latter type is best described as a neoplasm, it is of importance to record that the so-called venous angioma is more likely to cause the changes in the cord and the adjacent vertebræ which give rise to clinical symptoms. The dilatation of the pial veins may extend into the substance of the cord and be associated with a considerable degree of atrophy of the adjacent nervous tissue.

In only one case in the literature, which was described by Cobb,[18] did Globus and Doshay find reference to a cutaneous nævus occurring in the same dermatome as the spinal lesion.

There was little that was characteristic in the clinical courses of the cases described, which were usually progressive. Sargent[24] has, however, reported that in one of his cases there was an extraordinary variability in the symptoms from day to day; he regarded a variability and intermittency in the course to be characteristic of these lesions. In the few cases which have been investigated by spinal manometry and by lipiodol injection there has been little evidence of subarachnoid block. This point is perhaps worthy of consideration.

It is noteworthy that Dandy has found in certain of these cases that it is possible to unravel and remove the dilated spinal veins. When the veins in the substance of the spinal cord are involved, any attempt at interference with them would doubtless be fraught with serious danger. Nevertheless, simple decompression in certain cases seems to have yielded considerable relief. Furthermore, it must be recalled that cases associated with considerable diffuse dilatation of the spinal cord veins have been reported, in which a hæmangioblastoma lay deeper in the cord.

We have encountered recently at autopsy two cases in which widespread angiomatosis of both brain and spinal cord was present. Curiously enough, death in each case was due to ascending myelitis of the cord. Nevertheless it did not seem possible to relate this condition with any certainty to the vascular anomalies, which did not extend beyond the limits of the meninges.

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Reports of Cases.

PULMONARY LOBECTOMY FOR BRONCHIECTASIS.

By M. P. SUSMAN,
Sydney.

EXCISION of the diseased area of lung (either lobectomy or pneumonectomy) is the only cure for well-established or advanced bronchiectasis, although many patients improve greatly with medical and conservative measures, such as postural drainage and repeated bronchoscopic aspirations; this treatment may even cure mild and early bronchiectasis when there is no gross disease of the lung parenchyma. A patient with advanced bronchiectasis who is not suitable for the radical operation may gain some benefit from palliative operations, such as thoracoplasty or partial destruction of the lung by the cautery. These different modes of palliation and treatment have been discussed in various journals of late years and have reached the stage of acceptance in modern text-books. Yet in a recent discussion by the local section of pædiatrics

on the treatment of bronchiectasis in children there was, according to the report in THE MEDICAL JOURNAL OF AUSTRALIA of July 2, 1938, no mention of surgical measures beyond bronchoscopic aspiration and attention to the upper part of the respiratory tract. I do not propose to discuss here the surgical treatment of bronchiectasis, indications and contraindications, preoperative and post-operative management *et cetera*. I refer those interested in these points to articles in *The Australian and New Zealand Journal of Surgery*, Volume VI, Number 3, of January, 1937, to *The British Journal of Surgery*, Volume XXI, Number 82, of October, 1933, and Volume XXII, Number 86, of October, 1934, and to various other journals from abroad.

Here I wish to report briefly the histories of six patients who have been subjected to lobectomy for bronchiectasis. One patient died from a disaster which I have not seen recorded elsewhere. The other five patients recovered. I am indebted to Dr. S. V. Marshall for the excellent anæsthesia which, in the successful cases, was induced by the intravenous administration of "Pentothal Sodium" and maintained by a mixture of nitrous oxide, cyclopropane and oxygen. The skiagrams and the diseased lobes of all six patients were essentially similar. Figure I represents a longitudinal section of the specimen in Case I, and Figure II is the lateral skiagram in Case II taken after the intratracheal injection of iodized oil.

Clinical Records.

CASE I.—Thomas D., aged forty-two years, developed a cough two years ago, soon after the removal of some teeth. The cough rapidly became productive, and he was soon bringing up six to sixteen ounces of foul sputum daily. His general health was declining and he became easily exhausted. Impaired resonance and distant breath sounds with scattered crepitations were noted at the base of the left lung; but no abnormal signs were detected elsewhere—an important point in view of the findings at autopsy. It is also important to note that at many bronchoscopic aspirations pus flowed freely from the left lower lobe bronchus, but none at all from other parts of the bronchial tree. Nothing even resembling a foreign body was ever seen. Plain skiagrams revealed fibrosis at the base of the left lung, and even on a later review of these films no foreign body could be detected. Bronchograms (skiagrams taken after injection of iodized oil into the bronchi) revealed obvious bronchiectasis of the lower lobe of the left lung; the other lung fields were normal.

The patient improved temporarily after a course of bronchoscopic aspirations, but soon relapsed when he returned to his home in the country, and he again came to hospital seeking a cure. I induced pneumothorax and five days later embarked on lobectomy under epidural anæsthesia administered by Dr. S. V. Marshall. All seemed to be going well as I reached the stage of passing the tourniquet around the hilum of the lower lobe, which was blue and airless. Then, before the anæsthetist was aware that anything was amiss, I observed that the heart's beat was becoming weaker and slower. Immediately afterwards I noted that the diaphragm was not only motionless, but was so flaccid that it was concave on its thoracic aspect. The patient's alarming condition was now apparent to all, and I thought that he was dead as I hurriedly closed the chest. In the meantime the anæsthetist was applying artificial respiration through the anæsthetic apparatus, and "Coramine" was injected intravenously. Recovery was as dramatic as the collapse, and within an hour it was hard to believe that the patient had been so near to death. It is clear that the anæsthesia had ascended to a dangerously high level. Three days later he was so well that I decided, after debating the relative merits of immediacy and delay, to proceed with the operation. This time the anæsthetic given by Dr. Marshall was cyclopropane. The diseased lobe was removed and the patient was returned to the ward in good condition. But ominous signs soon appeared. The next day he had fever, tachycardia and dyspnœa, followed soon by hiccup and auricular fibrillation. On the third day he had a rigor. Thereafter his condition progressively deteriorated in spite of the intravenous administration of fluid, blood transfusion and injections of "Prontosil". (Various types of streptococci had been found in the cultures made from the excised lobe.) The patient died ten days after the second operation.

At autopsy the left upper lobe was found to be moderately well expanded being adherent below to the diaphragm and to the chest wall. The upper part had not fully expanded and there was a collection of dark, offensive fluid, like beef tea, between the lung and the apex of the pleural cavity. In this lobe some red hepatization was seen. The stump of the lower lobe was in a satisfactory condition, in that the vessels and bronchi were well occluded and covered by the remnant of lung tissue of the lower lobe. The wound in the chest wall was well healed on the pleural side, but was inflamed and gaping externally. In the right pleural cavity there was a large collection of dark, offensive fluid similar to that found on the left side. In the upper and middle lobes of the right lung red hepatization was seen, and the lower lobe was gangrenous; an old tooth was lying quite loose in the bronchus to this lobe. The whole of the trachea and bronchial tree were acutely inflamed and filled with exudate. The pericardial sac contained several ounces of the same type of fluid as that present in the pleural cavities. The spleen was enlarged and soft.

It is improbable that the tooth found in the right lower lobe bronchus could have lain there since the dental operation over two years before without causing symptoms or signs. Throughout the illness the lower lobe of the left lung alone had given evidence of pulmonary disease (Figure I). My interpretation of the course of events is that the tooth lay undetected in the bronchus of the lower lobe of the left lung until it was disturbed at one of the two stages of the operation or between these stages. It was dislodged from the left bronchus and reached the right bronchus over the bifurcation of the trachea, setting up the intense infection that resulted in gangrene of the lower lobe and then in septicæmia and death.

CASE II.—Lois B. had had cough and sputum for four or five years. The sputum had increased lately in amount. At the time of examination it was about five ounces daily, and it was offensive. She was always tired and languid. Dr. B. Blomfield had attended to her sinuses *et cetera* in 1938, and had given her a course of bronchoscopic aspirations. These had given her appreciable relief; but as she still had a constant productive cough and some constitutional upset he referred her to me for lobectomy. This I performed a fortnight after inducing pneumothorax on the left side. Bronchograms had revealed that the bronchiectasis was confined to the lower lobe of the left lung (Figure II). She had moderate fever for three weeks; but this gradually subsided and she was allowed up four weeks after the operation. She is now well, except for an occasional cough productive of one or two drachms of sputum daily; the sputum is not offensive. I recently made a bronchoscopic examination and found a pool of pus in the stump of the bronchus of the lower lobe of the left lung; it was as though I were looking down a test tube with a little fluid in it. This bronchial stump is the source of the sputum, for a bronchogram made at the same time showed that there was no residual bronchiectasis.

CASE III.—William B., aged twenty years, had been treated as tuberculous at certain sanatoria and anti-tuberculosis clinics for seven years. He had had a cough since an attack of whooping cough in childhood, and for the past seven years he had had up to five ounces of purulent sputum daily, in which tubercle bacilli had never been found. He was undersized and his general condition was only fair. Bronchograms revealed bronchiectasis of the lower and middle lobes of the right lung. Through a bronchoscope I aspirated a large amount of pus from the bronchus of the lower lobe of the right lung; I did not see any coming from the bronchi of the upper or middle lobe, and the whole of the left bronchial tree appeared to be normal. The sputum decreased after several bronchoscopic aspirations. Then I induced a right pneumothorax, and

a week later I excised the lower lobe of the right lung, which was blue, solid and not adherent. The middle lobe, however, was very adherent, and I considered that the patient's condition did not warrant any prolonged attempts to free it. He was gravely ill for several days after operation; but his condition soon improved, and he was up on the twenty-first day, when the wound was soundly healed. A drainage tube was still in the lower part of the pleural cavity; this was retained for another four weeks. His condition continued to improve, but about three months after operation he was bringing up about one and a half ounces of sputum daily. Bronchoscopic examination revealed that it was coming from the stump of the bronchus of the lower lobe of the right lung and from the bronchus of the middle lobe; bronchograms confirmed the fact that there was bronchiectasis of the middle lobe of the right lung. The sputum is not offensive, as it was before operation, and the patient's general health is improved.

I propose to give him a course of bronchoscopic aspirations, and perhaps cauterize the stump of the bronchus of the lower lobe of the right lung. For this patient lobectomy has been a palliative success but a curative failure. Removal of the middle lobe will be considered later.

CASE IV.—Pauline N., aged twenty-nine years, was told seven years ago that she had bronchiectasis at the base of the left lung. At this time a left pneumothorax was induced, which gave relief until the lung eventually reexpanded. The daily amount of sputum varied greatly with changes in weather, with place of residence and with pregnancy, from a drachm to several ounces. Although her general condition had remained fairly good, she had lost ground recently and had had increasing pain in the left hemithorax. There was a small area of bronchial breathing over the angles of the eighth and ninth ribs, and bronchograms revealed advanced bronchiectasis of the lower lobe of the left lung. On bronchoscopic examination I found pus in the bronchus of the lower lobe of the left lung and none in any other part of the bronchial tree. As I had expected, I failed to induce pneumothorax before operating. I removed the lower lobe of the left lung without great difficulty, in spite of the universal adhesions. The patient had an uneventful convalescence until six weeks after the operation. At this time she became febrile and coughed up several ounces of bloody sputum daily for several weeks. (This is not a surprising complication and is due to an abscess forming around the stump; usually it is coughed up, but it may require open drainage.) Improvement soon followed and the patient is now well.

CASE V.—Constance F., aged thirty-one years, had had cough and sputum since an attack of whooping cough at the age of ten years. The daily amount was between one and three ounces, and it had an unpleasant smell and taste. Moderate clubbing of the fingers was present. Her general condition was good between frequent "colds", and she had not lost weight recently. During the past year she had had some pain in the left side of the chest, and the sputum had occasionally been blood-stained. There were no gross physical signs in the lungs; but bronchographic examination revealed bronchiectasis of the lower lobe of the left lung.

I aspirated pus from the lower lobe of the left lung through the bronchoscope several times, and Dr. B. Blomfield attended to her nasal sinuses. Several months later I induced pneumothorax on the left side and then injected 50 cubic centimetres of 1% peptone broth into the pleural cavity and removed as much air as possible, in the hope that an aseptic pleurisy would follow and would result in the upper lobe becoming sufficiently adherent not to collapse when the chest was opened. I waited ten days before proceeding with lobectomy. There was not the slightest adhesion of the lung to the parietal pleura; the whole lung fell away from the chest wall when the pleura was incised. I removed the lower lobe, which was very contracted, blue and semi-solid. The patient bore the operation well and the upper lobe expanded rapidly; but convalescence was interrupted by temporary relapse of an old mental aberration. Five weeks after operation her physical and mental health was good and steadily improving. The latest report is that she has no cough or sputum and that her mental state is apparently normal.

CASE VI.—Charles B., brother of Lois B. (Case II), aged twenty-three years, had had a productive cough for six years. The daily amount of sputum was three to four ounces, and it had an offensive odour. The fingers were clubbed. Apart from the cough and sputum he was apparently quite well and was able to work and play like a normal man. He had had one attack of pleurisy on the left side and one hæmoptysis. Dr. B. Blomfield attended to the upper part of his respiratory tract and then referred him to me. Bronchoscopic examination revealed that all the pus was coming from the lower lobe of the left lung, and bronchograms confirmed the diagnosis of bronchiectasis at the base of the left lung. I induced a small pneumothorax, injected 50 cubic centimetres of 1% peptone broth into the pleural cavity and then withdrew the air. This failed to produce adhesion of the lung to the chest wall, as it had failed in Case V, though this time I waited three weeks before operating. I freed the lower lobe without great difficulty, except where it was adherent to the medial half of the diaphragm, and removed it. This patient is now well.

Charles and Lois B. have four sisters, all healthy, and there is no history of pulmonary disease in the family tree.

Addendum.

Since writing this paper I have performed three more lobectomies, of which I give details.

1. William B. (Case III above) has had the right middle lobe removed. This time he stood the operation very well and is now making a satisfactory convalescence. It was interesting to find how well the stump of the lower lobe had healed; the middle lobe was adherent to the pericardium and the diaphragm, and when it had been removed it was impossible to recognize the stump of the lower lobe by inspection, as it was completely covered by the mediastinal pleura, through which it could be felt indistinctly. I passed a bronchoscope immediately before the operation, as is my wont, to aspirate any secretions, and with biopsy forceps I removed a long piece of a silk ligature which was lying free in the lumen of the stump of the lower lobe bronchus. Dr. S. V. Marshall was the anæsthetist.

2. Marjorie W., aged twenty-seven years, dated her illness from an attack of pneumonia four years previously. She had had all her teeth removed, but did not associate her illness with her dental treatment. She had about five ounces of extremely foul-smelling sputum daily and had constitutional effects of toxæmia and very advanced clubbing of the fingers and toes. Bronchograms revealed saccular bronchiectasis of the right lower and middle lobes. I aspirated pus through the bronchoscope once a week for six weeks, and supplemented this treatment with postural drainage; improvement in the general condition took place, and diminution of the amount of sputum and of its fœtor. At the third bronchoscopic aspiration I extracted a broken fragment of tooth from the lower lobe bronchus. Dr. S. V. Marshall was the anæsthetist for the operation of removal of the lower and middle lobes. Adhesions made the operation difficult, but the patient stood it well, and her condition was good after a blood transfusion. But signs of severe sepsis soon appeared, with the development of a putrid empyema, and she died twenty-seven days after operation, in spite of several more transfusions, chemotherapy and adequate drainage of the empyema. Autopsy showed that the empyema had been well drained and that the stump had healed well; but the right upper lobe and both lobes of the left lung had a number of septic infarcts, several of which had suppurated. The spleen was of semi-liquid consistency.

3. Neville J., aged twenty years, began to suffer from cough, sputum and attacks of fever soon after the extrac-

tion of some teeth under general anæsthesia. Eleven weeks after the dental operation Dr. R. Murphy removed a tooth from the right lower lobe bronchus. But suppuration persisted and frequent alarming hæmorrhages occurred. Bronchograms confirmed the clinical and bronchoscopic diagnosis of bronchiectasis confined to the right lower lobe. One attack of pneumonitis was complicated by empyema, which responded well to drainage. I performed lobectomy in two stages, Dr. C. Paton being the anæsthetist on both occasions. At the first stage dense adhesions secondary to the empyema made liberation of the lower lobe unusually difficult, and as the patient's condition was not good I desisted at this stage. Six weeks later I completed the operation. Convalescence was complicated by a brisk hæmoptysis combined with bleeding through the intrapleural drainage tube; this was followed by a temporary increase in the amount of purulent discharge and sputum, and recurrence of fever. I have no doubt that these disturbances were due to the formation of an abscess around the stump of the lobe, which failed for a time to drain away fully. The patient is now well.

I have two other patients who survived lobectomy; this makes a total of eleven lobectomies among ten patients, with two deaths. These figures are too small for statistical purposes; my results should improve with increasing experience.

Although it was a discussion on the treatment of bronchiectasis in children that prompted this paper, I have had to cite my experiences with adult patients because I have not yet had an opportunity of performing lobectomy on a child. It would appear that many physicians fear that the risk of operation is prohibitive or that the disease in children is not serious enough to warrant the risk. Clinicians abroad, in general, have found that the prognosis of bronchiectasis in children is so bad that they do not hesitate to recommend operation in selected cases; they are encouraged to do this because children bear the operation well and have a lower operative mortality rate than adults. As examples I refer to the results of H. A. Cookson and George A. Mason (*Edinburgh Medical Journal*, Volume XLV, Number 12, December, 1938), who record a series of 31 lobectomies among children, with four deaths, and those of Tudor Edwards (*The British Medical Journal*, April 22, 1939), who has operated on 38 patients between the ages of four and sixteen years with no death. Bilateral disease *per se* is no longer considered a contraindication to radical operation.

It is possible that bronchiectasis is not so serious a disease in Australia as it is in other countries. Follow-up investigations, especially from the different children's hospitals, would doubtless produce some evidence on this point. Dr. Clive Selby, surgical registrar at the Royal Alexandra Hospital for Children, has recently made such an investigation at his hospital, and I am indebted to him for supplying me with a copy of his paper before publication. He conned the records of 120 cases and examined 31 at the follow-up clinic. I do not agree that there is any warrant for his conclusion, from the evidence he produces, that "major surgery, such as lobectomy, is not justifiable in the treatment of bronchiectasis in children in this State, except in extremely isolated cases, and therefore does not form an important part of the treatment of the disease in New South Wales." My main criticisms are the following: (i) Too few patients were traced (50 out of 120, and 31 only were personally seen). (ii) The Registrar-General's records were searched for deaths for a five-year period after each patient's discharge. This length of time is much too short for a chronic disease like bronchiectasis, with an appreciable late mortality and morbidity rate. But even this limited follow-up showed that six of the 99 discharged patients died within five years of their discharge, a mortality rate of a little over 6%. Twenty-one died in hospital, a death rate of 17·5%. These figures are approximate only, as some of the fatal cases were not included in the series. The total number of deaths, therefore, within five years of admission to hospital was 27, a death rate of about 22·5%. These are minimal figures, because some of the later patients in the series (the 1935 to 1938 group) have not yet been discharged for a five-year period. Even allowing that many of these patients were unsuitable for operation or would not have survived operation, it appears that an appreciable number might have been alive and in good or improved health if they had come to operation. (iii) Of the 64 untraced patients, how many have died later than five years after discharge from hospital, and how many are doomed to progression of the disease as the years pass? Without information on these points it is surely not right to dogmatize about the need for surgical treatment, especially as the oldest patient traced was only twenty-one years old. (iv) Bronchograms were lacking in a proportion of these 120 cases. I think that a plain radiogram is not of much value in the diagnosis of bronchiectasis except in advanced cases. It is probable that a significant number of the 120 patients were not bronchiectatic at all.

EXTENSIVE PRIMARY NERVE AND TENDON SUTURE AT THE WRIST: A REPORT OF TWO CASES.

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In view of the frequently poor results of nerve and tendon suture and the discussion concerning the question of primary suture, the following two cases are of some interest.

Case I.

D.A., a female, aged three years, was admitted to the Children's Hospital, Melbourne, on October 21, 1938, having lacerated her wrist four hours previously by falling on an earthenware basin in her home.

Examination revealed an extensive laceration of the right wrist. The child was in good general health. Five hours after the accident she was taken to the operating theatre, an ether anæsthetic was administered and the wrist was cleaned and thoroughly swabbed with a 1 in 500 solution of acriflavine. It was then ascertained that the following structures had been completely divided at the proximal border of the transverse carpal ligament: all tendons of the *flexor digitorum sublimis*, all elements of the *flexor digitorum profundus* at this level (that is, the tendon to the index finger and the musculotendinous mass destined for the three ulnar fingers), the *palmaris longus*, the median nerve, the *flexor carpi radialis*, the *flexor pollicis longus*, the *abductor pollicis longus* and the *extensor pollicis brevis*. The wrist joint had been opened and a shaving of cartilage separated from the navicular bone. The radial artery had not been severed. The various elements were individually united to their corresponding fractions, fine white silk being used as suture material. In the case of the *flexor digitorum profundus* the index finger slip was sutured separately and the rest were united by two mattress sutures. The separated piece of cartilage was removed from the wrist joint.

To effect this repair it was necessary partly to divide the transverse carpal ligament longitudinally; it was repaired at the conclusion of the procedure. The skin was united with interrupted horsehair sutures and the wrist and fingers were maintained in full flexion by means of a posterior plaster slab. Tetanus antiserum was administered.

The wound healed by first intention, and the child was discharged to the out-patient department on October 30, 1938, nine days after her admission to hospital. Active movements, carried out once a day, were begun under the supervision of a masseuse on the fourteenth day, the plaster slab being replaced between treatments. The slab was discarded one month after the operation, and active

movements were continued, by this time with the intelligent aid of the mother also. On January 19, 1939, two months after operation, all movements of the wrist and fingers were perfect, and sensation was normal except for some anæsthesia over the terminal phalanges of the index and middle fingers.

By May 4, 1939, except for a scar on the wrist and slight wasting of the small thumb muscles, it would be impossible to notice that anything untoward had occurred in this region.

Case II.

M.D., a female, aged two years and four months, was admitted to the Children's Hospital, Melbourne, on October 10, 1938, having fallen and cut her hand on a broken glass bottle three hours previously.

Examination revealed that the child was in good general condition; an extensive laceration was present, involving the tendons at the left wrist. Four hours after the accident the patient was taken to the operating theatre, an ether anæsthetic was administered and the wrist region was cleaned and swabbed thoroughly with a 1 in 500 solution of acriflavine.

It was then seen that a clean laceration, extending transversely from the hypothenar eminence across and through the distal part of the transverse carpal ligament, had completely severed the following structures: the hypothenar muscles, the deep and superficial branches of the ulnar nerve, the ulnar artery, all the tendons of the *flexor digitorum sublimis*, the index tendon of the *flexor digitorum profundus*, the median nerve and the *flexor pollicis longus*; the other elements of the *flexor digitorum profundus* were partly divided. The various ends were identified and anatomical continuity was restored, fine white silk being used as suture material. Division of the transverse carpal ligament was found necessary; it was later sutured with silk. The skin was closed with interrupted horsehair sutures and the wrist and fingers were maintained in full flexion by means of a posterior plaster slab. Tetanus antiserum was administered.

On the fourteenth day, by which time the skin wound had healed by first intention, active movements of the wrist and fingers were encouraged by massage carried out once a day, the plaster slab being replaced between these periods. On November 1, 1938, three weeks after her admission to hospital, the child was discharged to the out-patient department, where the treatment was continued, the plaster slab being discarded one month after operation. The child's progress was interrupted by five weeks' confinement to the precincts of the Queen's Memorial Infectious Diseases Hospital, owing to the development of scarlet fever on January 12, 1939. On her liberation treatment was resumed on the lines described.

Seven months after the injury the child appeared to have normal sensation in the hand and all the divided tendons were functioning well. There was some inability to extend fully the index and middle fingers, and opposition of the thumb was a doubtful entity. Apart from this difficulty all the intrinsic hand muscles appeared to be normal.

Comment.

Both cases illustrate excellent results of primary tendon and nerve suture, the massive nature of which appeared to indicate a relatively poor prognosis.

Controversial points are: (i) the primary suture, (ii) the inhibition of movements until the fourteenth day and their limitation until one month after operation, and (iii) the position of full relaxation of the divided structures used.

Acknowledgement.

My thanks are due to Dr. H. Douglas Stephens for his kind permission to conduct the full treatment of these patients.

Reviews.

JOINT MANIPULATION.

THE author prefaces his work, "The Science and Art of Joint Manipulation", with a frank discussion of the present position of manipulation of joints in the practitioner's equipment.[1] He impartially points out our failings and failures, and some of their causes, while admitting that the unqualified practitioner may occasionally amaze the patient and confound his more cautious, if better trained, medical prototype with a brilliant success. Deploring the absence of a course of training in the science and art of manipulation from the medical curriculum, he draws attention to the sins of omission of the trained and conscientious practitioner who prefers not to submit his patient to the risk of injury from untried methods, as well as to the sins of commission of the man, unqualified and unequipped with a knowledge of the fundamental sciences of anatomy, physiology and pathology, who indiscriminately manipulates the joints of his all-too-willing patients, often awakening a quiescent disease and even removing any hope of allowing Nature to exert her healing powers. The book has been written in the hope that it would make the art of manipulation a scientific possibility, and so provide a substitute for the existing untenable creeds of the osteopath and chiropractor. The dangers of unscientific manipulations, even in the hands of those who believe in the efficacy of this form of treatment, are duly emphasized. The author is uncompromising in his doctrine that mere brute strength is of no avail and cannot replace technical skill and accurate knowledge of all the movements of a joint, save to the disadvantage of the patient. In spite of his enthusiasm for skill and finesse in manipulation, he recognizes the value of active cooperation by the patient, both during and after treatment: "function comes from within, and no one can cause a joint to function save the individual to whom the joint belongs". He is not blind to the possible influence of other conditions, such as focal sepsis, on the production of conditions amenable to manipulation, and recommends the elimination of such as a necessary part of successful treatment. Rules to guide the would-be manipulator are laid down; but it is expressly stated that these are only a basic guide, perseverance and practice being required to enable him to acquire a successful technique. Caution and gentleness are the dominant notes of this work, as the author strongly dissents from the view that a joint fixed to any great extent by adhesions should be put through its full range of movement at one sitting. Manœuvres described are well illustrated by excellent photographs, reproductions of skiagrams and line drawings, and they greatly enhance the value of the work.

The whole work is of such a high standard that we look forward with interest to the second volume—it may be as good, but we doubt whether it could be better. It should be in the library of every medical school; no teacher of the subject should be content to remain long without it.

CONTRACEPTION.

THE literature on contraceptive technique forms an ever-increasing volume of modern lay and medical publications. One must, however, look to America for a monograph such as "The Vaginal Diaphragm", by Dr. Le Mon Clark,[2] to find a book dealing in meticulous detail with one particular form of contraception. In these days of specialism such a publication as this suggests the

[1] "The Science and Art of Joint Manipulation", by J. Mennell, M.A., M.D., B.C.; Volume I: The Extremities; 1939. London: J. and A. Churchill Limited. Crown 4to, pp. 245, with illustrations. Price: 18s. net.

[2] "The Vaginal Diaphragm: Its Fitting and Use in Contraceptive Technique", by Le Mon Clark, M.S., M.D.; 1939. St. Louis: The C. V. Mosby Company; Australia: W. Ramsay (Surgical) Proprietary Limited. Demy 8vo, pp. 106, with illustrations. Price: 10s. 6d. net.

development of a new specialty, contraception. Whilst we feel that this book will be considered by many to make a mountain out of a molehill, yet such criticism in the home of its production may not be warranted.

There is no doubt that about contraceptive technique there is much to say, and a critical review of available methods will frequently bring the reader into agreement with Dr. Clark in his preference for the vaginal diaphragm. The arguments he brings forward in its favour are sound, but we feel that, broadly speaking, there is more necessity to individualize with persons requiring advice. Dr. Clark hints that in women with relaxed outlets the diaphragm has disadvantages; we feel that in such cases other forms of contraception are desirable. His tendency to make the diaphragm fit the vagina in the presence of abnormalities of vaginal pattern would, to our mind, be better replaced by an effort to provide for an alternative form of contraception.

Whilst there may be some justification for the practice of avoiding the possible pain and associated emotional stress of the first marriage night by premarital treatment of the bride, it seems unlikely that the Australian viewpoint will coincide with this idea. There may perhaps be exceptional cases in which dilatation or division of the hymen and fitting of a diaphragm is advisable, but medical opinion here is far from advocacy of this as a regular practice.

Dr. Clark's first "philosophy of fitting", that is to place the diaphragm across the fornices, is more than deserving of the criticism and disadvantages which he himself makes of this method. The advisability of leaving the diaphragm in position for a longer period than twelve hours irrespective of "the philosophy of its application" is also open to criticism. Such practice, we feel, would, by inducing an endocervicitis, seriously interfere with the underlying idea of contraception mentioned by him, that is the spacing of families.

We have no quarrel with the vaginal diaphragm as a contraceptive measure—in many cases it is as near the ideal as one can go. In this respect the subject matter of the monograph is little deserving of criticism. The production generally, together with the diagrams and illustrations, is so good that we think it worthy of even a better cause. As a reference book for those whose duty it is to advise and teach contraception it should be useful, for undoubtedly fitting is all-important. We cannot, however, fail to believe that in Australia this monograph and some of its teachings will have little appeal.

SCIENTIFIC AND RELIGIOUS PSYCHOTHERAPY.

DR. MARCUS GREGORY in his "Psychotherapy, Scientific and Religious" has handled an immense problem with conspicuous success.[1] The book epitomizes the history of psychotherapy from the earliest times to the era of Freud, Jung, Adler and the hypnotists. The author outlines the psychological aspects of Christianity in order to show how they may be reconciled and embodied in the complete formulation. Of necessity he discusses the problem of the confessional and lay psychologists.

The author has been helped by his unusual experience. After a theological course in Egypt he was ordained a chaplain to the Archbishop of Ethiopia. From thence he gravitated to Oxford and studied under Dr. William Brown and Professor Grensted, both of whom have contributed a eulogistic foreword to this volume. Dr. Gregory combines a lucid style of writing with a critical and balanced outlook on his subject. His views on current trends are sound. He steers a middle course without bias or rancour. The book is worth reading if only to brush up our knowledge on the conflicting psychological schools. But it has the merit of provoking thought on other vital problems. In its wide sense almost every individual craves for a religion, as an integrating factor which will unify widely differing trends. As the author writes:

> There must surely be some focal point for all impulses; otherwise the personality will be equally as torn in various directions as it was before. To be properly integrated, the mind must be able to stand above the flow of events and not be swayed here and there by the merely transitory. It must have some answer to the question, "Whither?", besides which the question "Whence?" is of relative unimportance.

Link, in his "The Return to Religion", has recently drawn attention to the same theme. No psychotherapist can reasonably avoid using religion as an aid in his work. If faith is essential for the "whole" man, it is equally if not more needful for the invalid.

It is to be regretted that the author confines his remarks almost entirely to Christianity. It is true he has a word to say on yogi teachings, but he ignores Mohammedanism, Buddhism and Confucianism. No doubt this is due to his own background. There are, however, psychological truths in all the great religions. In certain respects they reinforce and even shed a clearer light on Christianity by giving a viewpoint from another angle. Perhaps Dr. Gregory will at a later date repair his omission by giving us a work on psychotherapy and the comparative religions.

His views on the problems of the priest may be summarized: "Naturally not all clergy can become expert psychotherapists, nor is it necessarily desirable that they should; but much good might be done if they could work hand in hand with psychotherapists in the same way as many of them already collaborate with the medical profession. The ills of the psyche are even more his concern, and, if he could not himself deal with the more difficult of the cases, he might act as a clearing-house, where those who needed serious treatment could be diagnosed and recommended to specialists."

Few will deny that the confessional has its uses; but there remains the difficulty of how the priest is to acquire sufficient psychiatric knowledge. This question is discussed in the final chapter, entitled "Who is Qualified for the Task?" It is agreed that whilst the healer must have had experience, he must also have an aptitude.

This book can be confidently recommended for those who are interested in psychotherapeutic problems. There is a useful glossary for those not familiar with the specialized nomenclature.

[1] "Psychotherapy, Scientific and Religious", by M. Gregory, B.Litt., D.Phil.; 1939. London: Macmillan and Company Limited. Medium 8vo, pp. 512. Price: 21s. net.

Notes on Books, Current Journals and New Appliances.

DIAGNOSIS AND TREATMENT.

THE 1939 volume of the year book known as "Modern Treatment in General Practice", edited by Dr. C. P. G. Wakeley and issued by *The Medical Press and Circular*, has appeared.[1] This book has now appeared for several years and, as its editor states, has become firmly established as an "annual". It contains a series of articles which "constitute a refresher course"; and it is divided into two sections. In the first are thirty-six articles by well-known clinicians on the treatment of various conditions which are likely to be met by the general practitioner. The second section is appropriately named the "Pitfalls" section. The articles here, again by prominent clinicians, are in two groups. The first is the "swellings" group, the second the "chest conditions" group. These are all practical and useful contributions. The "swellings" include those of the thyreoid gland, the breast, the axilla, the groin, the neck and the lower jaw. In the "chest conditions" group are articles on pitfalls in the diagnosis of bronchitis, of pulmonary tuberculosis, of bronchiectasis, of intrathoracic tumours, of empyema and of chest radiology. The book will be found useful by most general practitioners.

[1] "Modern Treatment in General Practice. Yearbook 1939: A Yearbook of Diagnosis and Treatment for the General Practitioner", edited by C. P. G. Wakeley, D.Sc., F.R.C.S., F.R.S.E., F.A.C.S., F.R.A.C.S.; 1939. London: The Medical Press and Circular. Demy 8vo, pp. 377, with illustrations. Price: 12s. 6d. net.

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TUMOURS OF BONE AND THEIR CLASSIFICATION.

IN 1927 Anatole Kolodny, of the Department of Surgery of the State University of Iowa, published a study of seven hundred cases recorded in the Registry of Bone Sarcoma of the American College of Surgeons. This important monograph was the subject of a special abstract and of editorial comment in THE MEDICAL JOURNAL OF AUSTRALIA of August 20, 1927. It was a notable piece of work which has been of great value to pathologists and surgeons, for not only did Kolodny summarize the knowledge then available, but he recorded his studies of a vast amount of clinical material. The classification of bone lesions recorded by him as being accepted by the committee of the Registry of Bone Sarcoma included eight headings: (i) metastatic tumours primary in tissues other than bone; (ii) periosteal fibrosarcoma; (iii) osteogenic tumours, (*a*) benign, (*b*) malignant; (iv) inflammatory conditions; (v) benign giant cell tumours; (vi) angiomata, (*a*) benign, (*b*) malignant; (vii) Ewing's tumour; (viii) myeloma. Kolodny discussed only the primary sarcomatous bone tumours, but included the benign giant cell tumour because, as he stated, "the relation of it to malignant bone tumour is still shrouded in mystery in the minds of the average clinician and pathologist".

It is but to be expected that with the passing of the years the registration and study of bone tumours have yielded information justifying a review of classifications previously accepted. Students of the subject will therefore read with expectant interest a recently published report, appearing under the name of James Ewing, from the committee of the Registry of Bone Sarcoma.[1] In this report the classification is reviewed and a new classification is set out. Strangely, no mention is made of Kolodny's study, but in the opening paragraph Ewing refers to a classification set out by the registry in 1928. This classification contains four groups: osteogenic sarcoma, giant-cell tumours, endothelioma and myeloma. Sub-headings are given to the first, third and fourth of these. Ewing points out that the committee's classification of 1928 and the newly proposed classification are based on histogenesis, and this principle has been followed throughout. The designation of sub-varieties is based on pathological anatomy "because this method lends itself to the practical needs of surgeon, radiologist and pathologist". The sub-varieties of true myelomata are classified according to histogenesis or cell of origin because the gross features of all myelomata are so much alike. The revised classification (1939) may be set out as follows.

1. Osteogenic series (osteogenic sarcoma)—
   Benign: (i) exostosis, (ii) osteoma.
   Malignant: (i) medullary and subperiosteal; (ii) telangiectatic; (iii) sclerosing; (iv) periosteal; (v) fibrosarcoma, (*a*) medullary, (*b*) periosteal; (vi) periosteal, capsular.
2. Chondroma series—
   Benign: chondroma.
   Malignant: (i) chondrosarcoma, (ii) myxosarcoma.
3. Giant-cell tumour series—
   Benign: epiphyseal giant-cell tumour.
   Malignant: malignant type.
4. Angioma series—
   Benign: (i) cavernous angioma, (ii) plexiform angioma.
   Malignant: (i) angio-endothelioma, (ii) diffuse endothelioma.
5. Myeloma series—
   Malignant: (i) plasma cell, (ii) myelocytoma, (iii) erythroblastoma, (iv) lymphocytoma.
6. Reticulum cell lymphosarcoma.
7. Liposarcoma.

[1] *Surgery, Gynecology and Obstetrics*, May, 1939.

Ewing is responsible for the term osteogenic sarcoma. In the present report he tells us that considerable discussion has occurred regarding the validity of the term "osteogenic" to designate tumours derived from bone. It has been asserted that this term may signify only "producing bone". Ewing quotes Webster's Dictionary as stating that osteogenic means "originating in bone". This is the sense in which it is used in the committee's classification. Kolodny explained the term by stating that its true meaning was a sarcomatous tumour derived from cells which, when duly differentiated, were known as osteoblasts. An osteogenic sarcoma was thus an osteoblastoma, somewhat as a carcinoma of the skin was an epithelioma. There was, he explained, this difference, that while in the latter the epithelial cells were more or less typical and differentiated, in an osteogenic sarcoma various stages of development of osteoblasts could be seen, from a simple spindle cell to mucoid, cartilage or even bone cell. Production of bone was merely a potential ability of tumour cells. In the new classification there are sub-groups of medullary and subperiosteal and of periosteal types. It is interesting to note that Kolodny insisted that the division of osteogenic sarcomata into periosteal, medullary and subperiosteal groups was valueless as far as clinical diagnosis was concerned. Ewing, in the present report, states that medullary and subperiosteal sarcoma is the term applied to the typical form of bone sarcoma which arises from the shaft of the bone and grows freely into the marrow cavity and also under the periosteum. "It lifts the periosteum and produces the characteristic triangle of Codman." Of periosteal sarcoma Ewing writes: "Periosteal sarcoma of spindle cell structure, varying grades of malignancy, absence of bone production, and peculiar metastatic tendencies, presents such notable specific features as to require recognition as a separate type of bone sarcoma"—a peculiarly worded sentence that is hard to understand. He adds: "The origin from the outer layer of the periosteum and preservation of the shaft serve to distinguish it roentgenographically from the destructive forms of bone tumours." In the third edition of his book "Neoplastic Diseases" (1928) he writes:

> A definite group of malignant tumours of bone arise from the periosteum, apparently from its outer layers, and grow outward without producing any great change in the shaft, and entirely free from any involvement of the marrow cavity. These tumours differ from others in anatomical relation, structure, and clinical course, and are best designated by the old term, periosteal sarcoma. While derived from the periosteum, the cells of origin probably do not include the osteoblasts, and the tumours show very little tendency to produce bone.

Kolodny stated that destruction of bone was a condition without which there was no osteogenic sarcoma. If, as Kolodny stated, an osteogenic sarcoma is derived from cells which, when duly differentiated, are known as osteoblasts, and if Ewing is right when he states that periosteal sarcomata have cells of origin which do not include osteoblasts, we must conclude that the periosteal sarcomata of the type described by Ewing are not osteogenic sarcomata at all. This discussion is not purely academic, as it might appear to be. The committee of the Registry of Bone Sarcoma has probably included periosteal sarcoma in a special sub-group for reasons of clinical expediency—to avoid the creation of another major group. This may be justified, but it is likely to lead to confusion in the minds of those not fully informed on the subject. The type of tumour described by Ewing in his book and in this report as periosteal sarcoma was included by Kolodny under the heading of "unclassified sarcomata" and was called, we think correctly, extraperiosteal sarcoma. Ewing himself, in his book, adds this title in parentheses after his heading "periosteal sarcoma". As a matter of fact the term periosteal sarcoma of bone was originally used to describe all osteogenic sarcomata, and Kolodny was probably right when he stated that, osteogenic sarcoma being a diffuse process of involved bone, there was no way of determining precisely the medullary or periosteal origin.

If extraperiosteal sarcomata are to be included among osteogenic sarcomata, we cannot object to the inclusion of parosteal and capsular sarcomata. Ewing states that they may "with difficulty" be admitted to this group. He admits that they arise from fibrous capsules of joints and deep fasciæ,

that they often produce bone and cartilage, that they may be intimately attached to the bone, but that they do not originate from true bone tissue; and he adds that both surgeon and radiologist may find their diagnosis difficult. In discussing telangiectatic bone sarcoma, "a form of malignant bone aneurysm", Ewing states that further data are necessary before their true nature and relations can be determined, and that these data should relate to the part played by blood vessels in the origin and growth of other osteogenic sarcomata.

In his discussion on giant-cell tumours Ewing points out that the most important contribution during the last decade has been the proof that single and often multiple typical giant-cell tumours are dependent on the mobilization of calcium from the bones under the influence of parathormone secreted in excess by over-active and generally hyperplastic parathyreoid glands. He thinks it reasonable to assume that solitary giant-cell tumours, of identical structure and behaviour, are also the sequelæ of previous but transient disturbances of calcium metabolism. Against this simple solution, he points out, lies the fact that many observers have noted definite and apparently primary changes in the blood vessels of bone and have attributed the giant-cell reaction to the sequelæ of an angiomatous process. Ewing refers to the possibility that trauma may be a factor; and he concludes that whatever may be the true pathogenesis of giant-cell tumours, the main group remains quite compact and characteristic, and varies chiefly in grade of malignancy. Special attention should be drawn to the benign calcifying giant-cell tumours sometimes found in long bones. Their recognition is important, since they are readily cured by irradiation and should not be treated by amputation.

The subject of endothelioma of bone (diffuse endothelioma or Ewing's sarcoma) is full of interest. Ewing states that the existence of a specific variety of bone sarcoma of this general type has been widely accepted, but that its histogenesis is still under active debate. He refers to evidence presented by Oberling and Raileanu that this tumour arises from the reticulo-endothelial system and that the tumour cells exhibit capacity to differentiate into plasma cells, myelocytes, lymphocytes and even erythrocytes. He points out that according to this view the tumour represents a form of totipotent myeloma capable of forming any one of the specific types of myeloma. He cannot accept this view, and believes that Oberling and Raileanu have failed to distinguish between a specific type of endothelial tumour and other rare round-celled myelomata, among which may probably be some that arise from the hæmatopoietic cell system or indifferent lymphoid reticulum cells. He holds that the typical endothelioma of bone arises from capillary endothelioma and never exhibits any other properties than those belonging to vascular endothelium. It is interesting to recall Kolodny's suggestion of the probable constitutional nature of the disease. He attached significance to the fact that on the outskirts of Ewing's sarcoma there is evident an absence of blood-forming elements in the marrow. That Ewing's sarcoma is more than a simple bone tumour was, he thought, evidenced by the diffuseness of involvement and the multiplicity of foci of origin in the same bone and also by the appearance of multiple tumours, often very early in the course of the disease. Others have carried their scepticism further and have put forward a view well expressed by R. A. Willis, of Melbourne, in his book "The Spread of Tumours in the Human Body". Willis states that in view of the peculiar characters of the tumour, especially its appearance in multiple bones, it is especially necessary to inquire "if its claim to a primary origin in bone is secure, or whether it may not be metastatic in nature". He refers to Ewing's statement that the diagnosis of endothelioma of bone should not be made until a thorough search for a primary tumour had proved unsuccessful, and that this search might at times not be regarded as complete without autopsy. Willis holds with every justification that this search can never be regarded as complete without thorough autopsy. He refers to studies by H. C. Colville and himself which lead him to suspect that neuroblastomata will in many cases prove to be the responsible primary growth. Willis is not alone in his contention that the endothelial origin implied in the name of the tumour

is wholly unproven. Though many may agree with this view, they will possibly agree that for clinical reasons the place given to the tumour in the new classification should be allowed to stand until its true nature is determined.

In regard to myelomata, Ewing points out that the four varieties set out in the classification have become more firmly established during the past decade. Oberling and Raileanu, however, have furnished a substantial basis for the recognition of a group of reticulum cell sarcomata or lymphosarcomata. "They have also apparently shown that some tumours arising from the reticulum cells of the bone marrow may differentiate towards plasma cell, or lymphocytic, or myelocytic, or erythroblastic subvarieties." Ewing points out that all observers have not accepted this wide potency of the simple reticulum cell of the bone marrow. He also refers to the recognition many years ago by Kaufman of a pure reticulum cell lymphosarcoma of bone marrow. The committee recommends the recognition of pure reticulum cell lymphosarcoma, and urges the further study of this group along the lines pursued by Oberling and Raileanu; it is inclined, however, to exclude this tumour from the group of true myelomata.

Discussing liposarcoma, Ewing states that since 1928 a sufficient number of tumours of this kind affecting bone have been recorded to warrant its recognition in the present classification. Since it has no connexion with specific marrow cells it has been excluded from the group of true myelomata.

Ewing sums up the results of the present review in the following words:

The validity and practical value of the classification originally proposed by the committee are in general confirmed, but certain changes and additions are required to meet observations made during the past decade.

The introduction of a separate group of tumours derived from cartilage and producing cartilage is theoretically justified and would be of practical advantage. A new group of tumours of blood vessels is introduced, and diffuse endothelioma is assigned to this group.

Malignant giant cell tumours are recognized, and their occasional occurrence is emphasized. Epiphyseal giant cell tumours generally running a benign course are given a special entry.

The group of myelomas is limited to those tumours arising from specific marrow cells.

Reticulum cell lymphosarcoma, arising in bone marrow, is accepted as a well established variety.

Liposarcoma, arising from the fat cells of bone marrow, is accepted as a definite entity.

One of the most important statements in this report is contained in the last paragraph—in the future, registration will be limited by the Bone Sarcoma Registry to those cases in which some unusual and instructive feature is present, or in which special studies have been made in the field of ætiology. This is a logical determination. Classification that will make diagnosis possible is admirable, for, as Ewing remarks, unless surgeon and pathologist are familiar with what may happen in the bone, they will not be able to recognize what has happened. If they are able to recognize what has happened, it is much more important that they should understand why it has happened. Ewing mentions three avenues for future investigation. The first is that indicated by the fact that giant-cell tumours may follow parathyreoid activity and that the deposition of radium in bone results in the production of a malignant sarcoma. The second has to do with the influence of trauma; the third is concerned with the role of infection. This is a most fascinating study and we should like to see more of this work undertaken in Australia. It is unfortunately true that plenty of excellent material is available and there are funds from which a worker could be paid, but no one suitable for the work has been forthcoming.

Current Comment.

DERMATOMYOSITIS AND SCLERODERMA.

DERMATOMYOSITIS has been recognized sufficiently often of late to have excited some comment both in British and in our own medical journals. By some it has been described as a rare condition; but G. B. Dowling and W. J. Griffiths would prefer to regard it as relatively common, and in the same or a closely similar category as the more familiar condition called scleroderma or sclerodactylia.[1] They give brief accounts of two patients in whom the affection presented itself as sclerodactylia, preceded by Raynaud's symptoms. After a time facial stiffness from scleroderma appeared. The muscles, even of the palate and pharynx, were wasted; and general

[1] *The Lancet*, June 24, 1939.

weakness, progressive and profound, led eventually to death from exhaustion and bronchopneumonia. The clinical and histological characters of the skin and vessels are are stated by these authors to be identical in both affections. Œdema and erythema of the face are encountered in both conditions. These signs may simultaneously affect the forearms and hands. Such appearances are replaced by subcutaneous fibrosis in the chronic phase, which leads to the superficial development of telangiectasis and pigmentation. It is this stage which is often termed dermatomyositis. At no phase does the subcutaneous fibrosis extend into the underlying muscle. A separate atrophying myopathy accounts for the muscular weakness and disability.

The authors draw a parallel between the lymphocytic infiltration and degenerative signs found in skeletal muscle (especially the eye muscles) in hyperthyreoidism and *myasthenia gravis*, two conditions occasionally seen together in the same patient. Sections of muscle from the two patients with scleroderma reported in this article showed very similar changes, and a strikingly close resemblance has often been described in instances of dermatomyositis when histological investigation has been pursued. The fibres appear swollen, with loss of cross striation. Others are shrunken, with a contraction of the sarcolemma sheath, so that it appears almost as a continuous dotted line. Focal collections of lymphocytes, often around a blood vessel, appear in areas where the degeneration is far advanced. These alterations have been termed by most authors degenerative rather than inflammatory. They appear in their most advanced form in scleroderma, and in their earliest phase in thyreotoxicosis. Dowling and Griffiths are satisfied, in spite of the dissimilar clinical pictures, that the difference histologically is one of degree only. They assert that the reason for the failure of sclerodermatosis myopathy to become less pronounced after injection of prostigmin is that in this instance degeneration is so far advanced that nothing can restore muscular function, even momentarily. The authors suggest that Graves's disease is not a pure thyroxin intoxication, and that some other factor is operating to produce muscular weakness. This factor may be the one linking up these three obscure clinical states.

Dermatomyositis and scleroderma are characterized by well-marked metabolic disturbances. Creatine excretion is excessive; creatinine excretion shows marked fluctuations. There is also a deficient peripheral oxidation of carbohydrate, as determined by arterio-venous sugar differences. Similar alterations in carbohydrate metabolism occur in goitre, *myasthenia gravis* and acromegaly. Further, decalcification of bones is observed under the same conditions. Such studies of blood calcium and phosphorus as have been performed have been inconclusive.

The authors have certainly made out a good case for the view that these apparently varied clinical states may be of a fundamentally related character. Thus it would appear that dermatomyositis, *myasthenia gravis* and thyreoid disorders are linked not only by similar histological changes in the muscles, but also by metabolic disturbances resulting in osteoporosis, creatinuria and interference with the peripheral action of insulin. Some further clinical associations suggest themselves, such as pyrexia in hyperthyreoidism and dermatomyositis, degenerative changes in the thyreoid and affecting the muscles of deglutition in both *myasthenia gravis* and dermatomyositis. Biochemical and histological similarities are probably more dependable than clinical impressions, but must not be allowed to dominate the field entirely. Disturbed peripheral insulin action, atrophic changes in unused muscles and bones, and occasional colloid degeneration in the thyreoid are common to many chronic wasting diseases. However, with regard to the conditions described by Dowling and Griffiths, we still stumble along a dark road in a small territory of knowledge, and are grateful for any further light which is shed upon three such obscure affections.

THE TREATMENT OF ULCERATIVE COLITIS BY LIVER EXTRACT.

ULCERATIVE COLITIS is one of the truly serious diseases. Like other forms of ulcerative disease in the alimentary tract it tends to be recurrent; and, in spite of the enthusiasm of some of the authorities for various forms of treatment, it still remains a formidable complaint requiring long periods of treatment in hospital and causes a severe degree of invalidism. It is interesting to recall the many angles from which this disease has been studied. Its association with a certain more or less constant psychological type, its curious but by no means unique combination of functional and organic elements, its profound influence on the well-being of the whole body, its alleged relationship with a number of different bacterial agents, ranging from the dysentery group to the coccus described by Bargen, and its occasional relentless progress from chronic inflammation to terminal malignant degeneration, all these features have been studied at length. On reading the accounts given in the extensive literature on this subject we are struck by the diversity of opinion with regard to treatment. Indeed there seems to be really only one common factor: prolonged rest in bed, with all the nursing care that this entails. Some physicians even believe that these measures alone are just as successful as any other more dramatic or drastic therapeutic methods, whereas there are surgeons who believe that the patient's only salvation lies in some surgical procedure. One of the simplest lines of treatment advocated of late is the use of highly concentrated liver extracts.

Garnett Cheney records the use of this method in eight cases and claims excellent results.[1] In one

[1] *Archives of Internal Medicine*, May, 1939.

case the author states that the patient has recovered sufficiently to contemplate return to work after eleven years of invalidism. The preparations of liver extract used were a well-known non-concentrated extract and another, also well known but highly concentrated. The dosage was such as would be regarded as large for pernicious anæmia in patients requiring hospital treatment. Improvement was noted within a few weeks, and Cheney thinks that, if an allowance is made for the natural remissions found in this disease, the improvement was so constant in all his cases that it must be regarded as being directly related to the treatment. Proctoscopic examinations showed that a true remission had occurred, but up to the date of publication no evidence of alteration in the radiological picture was obtained. A follow-up of the patients indicated that a maintenance dose of liver kept the patients well. They all received a diet of high vitamin content, though the author does not believe that some such deficiency is the sole cause of the disease; naturally a vitamin deficiency must exist in many cases, even though it is of purely secondary nature. One would expect that if liver extract supplied a substance deficient in these patients, a less concentrated extract might be preferable on account of its greater likelihood of containing the desired fraction; but Cheney used a very concentrated preparation as a rule, because its small bulk allowed a high dosage without inconvenience. Off hand, the critic can only say that this report sounds almost too good and too simple to be true; but it should not be difficult to assess its value, and the cost of trial would be trifling when weighed against the advantage of remissions so readily obtainable by this means in this intractable disease.

THE USE OF SULPHANILAMIDE IN BACTERIAL ENDOCARDITIS.

THE list of pathological conditions for which the sulphanilamide series of drugs has now been employed is already inordinately long, but very early in the history of this drug the question of bacterial endocarditis was raised. There is good reason for this in one sense, for the almost uniformly fatal nature of the disease naturally caused physicians to hope that at last some logical method of attack had been evolved. This hope has not been realized, although a few reports have been encouraging. At first sight the problem does not seem so difficult: we have here a septicæmia, constant or intermittent, of known focal origin, and frequently caused by a streptococcus of modified virulence. But on closer examination there are difficulties. The subendocardial nidus of the organism is relatively non-vascular, in spite of the proximity of the blood stream which is constantly pouring past these fastnesses where the *Streptococcus viridans* colonizes. The actual immune response of the patient is usually good, and it is the rule for the blood to contain ample supplies of appropriate antibody. The inroads of the organism are, however, repeated and relentless. Successive swarms of bacteria invade the tissues of the host, and there is reason to believe that their life is but brief; they are of low pyogenic capacity, and of themselves each of the swarms would not be lethal. But the patient is menaced from several directions. The attacks go on and on; gradually his resistance wears down; he is subjected to successive embolic onslaughts; the kidneys and brain in particular are vulnerable by reason of their being important substations in the systemic blood circuit, and, quite apart from the infective factor, the organs are damaged by the act of infarction. All this time the unfortunate host has no efficient local weapon of attack, for no degree of humoral immunity can have much, if any, effect on the gradually spreading vegetations. It will be remembered, too, that the more chronic the disease, the firmer and less penetrable will be these nodules. It is not surprising to find some histological evidence of resistance and repair after death, but the process is usually too slow and too ineffective to save the body as a whole. These depressing considerations make it unlikely that any drug which would help to dispose of free floating streptococci would entirely solve the problem.

Z. J. Solway and H. G. Pritzker describe a case in which the exhibition of sulphanilamide appears to have had some definite good effect.[1] It is true that the patient did not survive; but he did at least live seven months after the diagnosis of bacterial endocarditis was proved, even though the infecting organism was a streptococcus of the hæmolytic variety. This feature is, of course, unusual, as this organism causes an acute variety of the disease and is less commonly found that the *viridans* type. Fairly large dosage was given in repeated courses, with intervals, and a blood concentration of 12 milligrammes per 100 cubic centimetres was maintained during the periods of administration. After these courses of treatment the patient, a man aged fifty-three years, improved greatly, and presented the picture seen in the bacteria-free stages of the subacute forms of endocarditis. Some months of slow deterioration followed, and a sudden recrudescence of symptoms preceded death. Autopsy showed that healing processes had taken place in various areas of the myocardium, in and around the scarred valves and in the kidneys. The clinical history suggests that the remission which permitted these changes was initiated by sulphanilamide. It would seem, however, that the best that the drug could do was to convert an acute to a subacute type of disease. As the authors justly remark, it would appear that the drug in no way affected the vegetations, nor did it alter the ultimate result. The number of case histories of bacterial endocarditis published with reference to the use of sulphanilamide does not seem to be large; but there is no

[1] *The Canadian Medical Association Journal*, June, 1939.

doubt that the drug has been widely used already in this condition; there seems little, if any, doubt also that its use has not been attended with success. That this result is to be expected for the reasons given above does not prevent us from giving sulphanilamide an extended trial, for there is really nothing else to be done, and nobody likes to abandon all attempts to reverse the advance of even so remorseless a bacterial enemy.

ACUTE INTERSTITIAL PNEUMONITIS.

CHRONIC interstitial pneumonia or cirrhosis of the lung is a well-known clinical entity. The term "pneumonitis" has been applied by American writers to single or multiple parenchymatous abscesses of the lung. These may follow pneumonia or other infective processes, but are rare in pneumococcal pneumonia unless pyogenic organisms are secondary invaders. It is ever a pity to add unnecessarily to an already overburdened nosology, but D. F. Smiley, E. C. Showacre, W. F. Lee and H. W. Ferris appear to be on sound ground in describing an acute interstitial pneumonitis as a disease entity.[1] In a fifteen-month period, which was free of pandemic influenza, they observed amongst the 6,569 students at Cornell University in Ithaca an epidemic of 86 cases of acute infection of the respiratory tract in which radiographs of the chest showed typical fan-shaped areas of increased density. In October, 1937, a type of respiratory infection arose which was different from anything previously noted by them. In most of the cases the aching in the bones and backache typical of influenza were absent. The cardinal features of the disease were specific lesions of the lungs, which were definite in skiagrams but not detected by the stethoscope. Some of the patients had skiagrams taken before definite evidence could be detected in the film and were then watched almost daily as the changes developed in the lungs. Others were reexamined at regular intervals. It was found that definite X ray evidence might not be forthcoming until from thirty-six to forty-eight hours after the clinical onset. Infection extended from the hilus outwards, following the bronchial and vascular tree. The authors divided their cases into three groups according to the radiographic findings. The onset was marked by increased density in the hilar shadows, with a fan-shaped localized accentuation of and numerical increase in the linear lung markings extending from the hilus to the adjacent lung field. Generally the extension is down to the base, but it may be lateral or into the first and second interspaces. In a milder group there appeared over this area a diffuse even increase in density, which was insufficient to eliminate the linear markings. It suggested intense congestion rather than consolidation of the lung. The visible changes did not generally reach the lung margin. They cleared generally in one or two weeks. In a second group, which were more seriously affected, the infiltration in the fan often reached the lung periphery, with irregular areas of greatly increased density, suggestive of lobular involvement and definite bronchopneumonia. Resolution was more tardy than in the first group. In 5% of the cases the involvement was severe. In these, in addition to the original focus, there was a diffuse spread through the rest of the lung with partial or complete implication of the other lung. This additional involvement displayed a generalized swelling of the pulmonic markings, with light mottling like that of pulmonary œdema or intense passive congestion with additional irregular areas of lightly increased density. Smiley and his colleagues consider that the underlying change in this class of case is a definite interstitial inflammation.

The onset of the disease generally was not sudden, but there were weakness, malaise and slight pyrexia for two or three days. The temperature gradually increases with sore throat, cough or pains in the chest; or a combination of these is noted. There is little or no sputum and no evidence of consolidation can be elicited by the stethoscope. As the disease progresses the temperature rises to 103° or 104° F. and may be of the inverse type. Sputum is absent or scanty and is neither "rusty" nor "cherry juice" in type. In the authors' third group there were a characteristic sudden elevation of temperature and evidences of toxicity. The pyrexia was more protracted and of greater severity. Moist râles were always heard, but the sputum remained scanty. A mild leucocytosis was noted, the number of cells reaching 16,000 and in one case 22,000 per cubic millimetre. Termination of the illness was by lysis. Complications were rare.

The authors try to answer the question: "Why is this disease not simply atypical pneumococcic pneumonia?" In stating their conviction that it is not, they draw attention to the radiological findings as being distinct from those of lobar pneumonia and bronchopneumonia, to the intermittent fever, the relatively mild leucocytosis, the character of the sputum and the relatively low respiratory rate. They also lay stress on the fact that the condition is more infectious than pneumonia and on their failure to find pneumococci consistently in the sputum. They think that the condition is probably identical with what other authors have described as "acute influenza pneumonitis", "acute pneumonitis" or "atypical pneumonia probably caused by a filtrable virus".

The authors have made an extensive clinical study, but their bacteriological findings are meagre. Cultures often yielded *Streptococcus viridans* and *Staphylococcus aureus* mixed. In mice tests with sputum the animals rarely succumbed; but when they did, pneumococci were found. It is a pity that the authors have not recorded their bacteriological findings in more detail.

[1] *The Journal of the American Medical Association*, May 13, 1939.

Abstracts from Current Medical Literature.

SURGERY.

Follow-Up of Hernia Repair.

ALFRED B. LONGACRE (*Surgery, Gynecology and Obstetrics*, February, 1939) reports the follow-up results of a series of 925 inguinal, femoral, epigastric and umbilical herniæ occurring among 752 patients. Analyses are made of the results under various headings. Wound infection took place in 2·5% of the repairs done with silk, and in 15% of those in which catgut was used. The recurrence rate showed a slight variation with the type of anæsthesia employed — general anæsthesia, 7%; spinal anæsthesia, 7·5%; local anæsthesia, 8%. Striking variations were observed with different suture materials. Four hundred and ninety-six herniæ were repaired with silk, of which 3·4% recurred. Chromicized catgut was used in 270 cases with 12·5% of recurrences. In the group of indirect inguinal herniæ, 278 were repaired with silk (2·2% recurrence) and 153 with chromicized catgut (9·8% recurrence). Seventy-four herniæ were repaired with fascial strips taken from the lower edge of the external oblique aponeurosis, with a recurrence rate of 6·7%. In 50 herniæ *fascia lata* was used; 16% recurred, but many of the patients had had previous operations. The author refers briefly to the evolution of operative methods for the repair of herniæ, and points out that little change has been made since the papers of Bassini and Halsted appeared over forty years ago.

The Fate of Transplanted Cartilage.

LYNDON A. PEER (*Surgery, Gynecology and Obstetrics*, March, 1939) discusses the fate of living and dead cartilage transplanted in human tissue. His conclusions are drawn from a series of rib graft operations on patients with deformities of the skull or nose. In these operations it is customary to "hoard" excess rib cartilage beneath the chest skin, to be used should the graft fail to remain in place. When the plastic repair is satisfactory the hoarded excess cartilage is removed and usually discarded; in this series the specimens were saved and examined. Thus grafts obtained for examination had remained beneath the skin for periods varying from six months to six years. In all operations the perichondrium was removed before transplantation. The specimens, which were removed after periods up to two years, appear as normal living cartilage. One specimen removed after four and a half years showed a thick layer of normal living cartilage peripherally, with a free space centrally, part of which was occupied by bone. The author considers this change to be due to impaired nutrition of the central portion. The six-year specimen appeared as normal cartilage with neither invasion nor absorption. The author reviews the literature on cartilage grafts and concludes that autogenous rib cartilage survives as living cartilage after transplantation, and up to periods as long as six years neither increases nor decreases in size. Further, autogenous rib cartilage is better material for plastic repair than dead pickled cartilage.

Traumatic Severance of the Common Bile Duct.

A. C. LYSAGHT (*The British Journal of Surgery*, January, 1939) reports a case of uncomplicated rupture of the common bile duct due to injury. The patient, a man, aged thirty-two years, a steel erector, was struck in the back while at his work with a steel rafter weighing about three hundredweight. He was thrown forward against a pile of steel girders. He "knew at once that his stomach was injured", owing to the sudden excruciating pain which he experienced. At operation free bile was found in the peritoneal cavity. The common bile duct was found to be completely severed. The upper end of the divided duct was sutured and a cholecystogastrostomy was performed. The patient made an uninterrupted recovery and was back at work two months later.

Acute Segmental Appendicitis.

JOSEPH FELSEN AND BENJAMIN LEWIS (*Archives of Surgery*, April, 1939) have performed on rabbits a series of experiments and have produced by vascular ligation lesions similar to those seen in acute segmental appendicitis in man. They review previous work on the anatomy of the blood supply to the human appendix, and conclude that the branches, generally five in number, of the main appendiceal artery are terminal vessels. Twenty instances of human segmental appendicitis are recorded, and Felsen and Lewis found this condition in 17·5% of a series of 200 patients with acute appendicitis. The authors discuss the relation of vascular occlusion to the ætiology of acute appendicitis.

The Treatment of Post-Operative Pulmonary Atelectasis.

A. E. MOORE (*Surgery*, March, 1939) describes the method used at the Cincinnati General Hospital for the treatment of massive pulmonary collapse, and includes also a brief consideration of the history and ætiology of this condition. Experimental and clinical evidence is quoted to support the view that pulmonary collapse is the result of a mucous plug obstructing a bronchus and preventing air from passing into the distal portion of the lung, thus allowing absorption of the trapped gas. Many secondary factors are enumerated, such as pre-existing tracheo-bronchial infection, reduced respiratory excursions, especially after abdominal operations, suppression of the cough reflex both voluntarily and by sedatives, and dehydration. Preanæsthetic medication with atropine is not thought to be of importance, and its use or avoidance has been found not to affect the incidence of the complication. Prophylaxis, according to the author, should include hyperventilation with carbon dioxide and oxygen, breathing exercises, hourly changes in position and adequate hydration. The rational treatment of developed pulmonary atelectasis must be directed to the removal of the bronchial obstruction. A diagnosis having been made, a tight abdominal binder is applied. With the pillows removed and the foot of the bed raised on high blocks, the patient is rolled onto his sound side. The patient places his upper hand over the wound. The physician stands behind the patient, reinforces the patient's support of his wound with one hand and with the other controls the patient's shoulder, rolling him slightly forwards onto his abdomen. This may be enough to initiate coughing. If not, the patient must be coaxed to cough; or coughing may be induced by deep breathing or a sharp blow on the back. This generally leads to loosening or expulsion of the plug. In obstinate cases inhalation of carbon dioxide or of tincture of benzoin and steam are tried. The adoption of this method of treatment has ended the necessity for bronchoscopic removal of mucus. The article is illustrated with reproductions of X ray films.

The Limitations of Phrenic Nerve Blockade.

R. H. OVERHOLT (*The Pennsylvania Medical Journal*, March, 1939) states that operations on the phrenic nerve have been exploited far beyond their limit of usefulness in the treatment of pulmonary tuberculosis. The indications have now been narrowed down to minimal lesions, to hæmorrhage in some cases and to lesions in the lower lobes for which pneumothorax treatment has been ineffective. Phrenic paralysis is contraindicated in the treatment of most patients who need the permanent upper selective collapse of thoracoplasty. Patients tolerate thoracoplasty less well with a paralysed diaphragm than with the muscle functioning. Unless phrenic paralysis alone can be counted on to effect cavity closure, or unless selective apical collapse is impossible, the diaphragm should not be paralysed.

Dextrose Utilization in Surgical Patients.

SHERWOOD B. WINSLOW (*Surgery*, December, 1938) has attempted an evaluation of the respective advantages of 5% and 10% dextrose solution for parenteral administration to the sick surgical patient. A timed intravenous pump was used to obtain accurate control of the amount and velocity

of injection of the dextrose solution. The patient was weighed daily on a Bradford frame, specimens of urine were obtained at hourly intervals and tested quantitatively for sugar content; a chart was kept of the daily fluid intake and output of all fluids. Tables demonstrating the results in the treatment of twenty-seven patients are given, and the author concludes that both 5% and 10% dextrose solutions may be used without harmful effects. Though 10% dextrose in distilled water is hypertonic with blood, is mildly diuretic, and can be given at the same rates of administration as 5% dextrose, it supplies the patient with 93% more carbohydrate than an equal volume of 5% dextrose solution. In the presence of liver damage, inanition, thyreoid crisis and cachexia, 10% dextrose solution is the solution of choice, and the optimal rate of administration is 200 to 300 cubic centimetres per hour.

Total and Subtotal Gastrectomy.

FRANK H. LAHEY (*The New England Journal of Medicine*, February, 1939) has treated in his clinic 3,534 patients with ulcer, gastric and duodenal, and of this number 8% of those with duodenal ulcer and 23% of those with gastric ulcer were submitted to operation. The operation of gastro-enterostomy, he considers, should not be applied as a routine in the surgery of peptic ulcer, and he has performed 362 subtotal and nine total gastrectomies. Of the 362 subtotal gastrectomies, 162 were done for cancer and 200 for ulcer. His mortality rate has fallen from 18% three and a half years ago to nil in the past eighteen months. The last 47 consecutive subtotal gastrectomies performed for ulcer were without a death. After considerable experience with all types of anæsthesia the author now uses dilute "Nupercain" spinal anæsthesia, 1 in 1,500 solution; he uses not more than 20 cubic centimetres. Complete relaxation is obtained for two and a half to three hours, with little shock. He is convinced that the Hofmeister type of subtotal gastrectomy with antecolic anastomosis is the most satisfactory, the lower third of the cut end of the stomach being anastomosed to the loop of jejunum and the upper end of the jejunum being buttressed over the closed upper two-thirds to reinforce it. He considers that entero-enterostomy is not only unnecessary, but undesirable.

Peroral Intubation and Drainage of the Small Intestine.

SAMUEL H. KLEIN (*Surgery*, December, 1938) has used the Miller-Abbott double lumen tube for the relief of intestinal obstruction with gratifying results. The object of this tube is decompression of the small intestine by the introduction of the tube into the jejunum and even the ileum. The intubation of the small intestine was found to produce results when the ordinary Levin duodenal tube had failed. Some difficulty was encountered in getting the tip of the tube to enter the duodenum; in five out of fourteen cases intubation could not be accomplished. Fluoroscopic visualization was used to follow the course of the tube. The author also suggests drainage of the intestine by this method in the preoperative and post-operative management of patients requiring operations on the small or large bowel.

Early Surgery in Biliary Disease.

E. L. ELIASON AND J. P. NORTH (*Surgery, Gynecology and Obstetrics*, February, 1939) enter a plea for earlier surgical intervention in biliary disease, both acute and chronic. The writers claim that surgery practised earlier in the disease and early in the acute attack has produced a remarkable reduction in morbidity and mortality. The increase in risk and technical difficulty due to inflammatory œdema in acute cases is discussed; and it is suggested that the operator, having regard to his own and the patient's limitations, will often be wise to content himself with a cholecystostomy.

"Liver" Death and the Hepato-Renal Syndrome.

ABRAHAM O. WILENSKY (*Archives of Surgery*, April, 1939) presents the results of a detailed study of the occurrence, pathogenesis and distribution of so-called liver death and/or the hepato-renal syndrome. He describes the two clinical types: (*a*) hyperpyrexia or "liver" death, and (*b*) delayed death or the hepato-renal syndrome. Hyperpyrexial death, it is pointed out, is not restricted to patients with conditions of, or after operations on, the biliary tract, but has been observed after resections of the rectum, hysterectomy, colostomy *et cetera*. High temperature death usually follows an operation which has proceeded without any alarming occurrence. There is an immediate and progressive rise of temperature, with irritability, then coma, and death within twenty-four to forty-eight hours. The hepato-renal syndrome is initiated by mild symptoms—lethargy, diminished output of urine, and gastro-intestinal upset. Recovery from this stage may occur, especially under treatment with large volumes of fluids containing sugar and salt. In the more severe cases there is no regression. Lethargy passes into coma, urine output diminishes further, and gastro-intestinal symptoms become severe, often with hæmorrhage. Jaundice is frequently seen. The author holds that renal effects are secondary to liver damage. In many cases the kidney, which after the liver is the great excretory and detoxifying organ, fails to take up the latter function when the liver breaks down; and this renal failure is frequently a decisive factor in the patient's subsequent total dissolution. Summarizing, the author maintains that there is no evidence of a biological or clinical connexion between hyperpyrexial or so-called "liver" death, and the protracted hepato-renal syndrome. He considers that liver death is probably related to some form of hyperacute bacterial infection, and that the ultimate generic cause of the hepato-renal syndrome is a poisonous body which may arise in any one of a number of different ways.

The Distension Factor in Simple Intestinal Obstruction.

O. H. WANGENSTEEN AND C. E. REA (*Surgery*, March, 1939) record the results of an investigation into the distension factor in simple intestinal obstruction. Previous work on dogs with experimental obstruction of the duodenum or of the pelvic colon had shown that life could be prolonged for weeks by the parenteral administration of normal saline solution, but that in ileal obstruction saline solution failed to prolong life materially. The authors set out to test: (*a*) the theory that distension was the main lethal factor, and (*b*) the view that distension was due largely to swallowed air. By dividing the ileum, closing the lower end and implanting the upper end into the stomach, they enabled the animal more readily to evacuate the ileal content by vomiting. Such a dog could be kept alive for eight weeks, and this supported the view that distension was the chief lethal factor. The agents which can cause distension are gas and digestive juices. Earlier chemical analysis had indicated that the gas in obstructed bowel contained about 68% of air. To test the importance of swallowed air further experimental surgery in dogs was undertaken. By a somewhat elaborate method the œsophagus was transected in the neck, the upper portion was brought to the surface, and the lower was closed and buried. This was performed in two stages; at the second the lower part of the ileum was divided and both ends were occluded. A closed loop of œsophagus, stomach and entire small bowel was thus made. Normal saline solution to a total of 1,500 cubic centimetres was given daily by the subcutaneous route. After the method had been mastered it was found possible to keep these dogs alive for periods averaging 36 days (longest 57 days). At autopsy the bowel was usually found collapsed. The authors conclude that the exclusion of swallowed air obviates the distension factor and in turn the sequelæ of decreased viability and increased permeability of the bowel wall; and that occlusion of the terminal part of the ileum may be well tolerated if the gut is not allowed to become distended. The experiments indicate that the bowel is capable of resorbing the digestive juices, and suggest that distension and not a "toxic factor" accounts for the lethal issue in ileal obstructions.

British Medical Association News.

SCIENTIFIC.

A MEETING of the New South Wales Branch of the British Medical Association was held on May 18, 1939, at the Royal Prince Alfred Hospital, Sydney. The meeting took the form of a number of clinical demonstrations by members of the honorary staff. Part of this report appeared in the issue of August 19, 1939.

Urological Exhibits.

DR. A. WALKER SMITH showed a number of skiagrams and specimens of urological interest. The first were from a male, aged fifty years, who had been admitted to hospital on April 15, 1937. At that time he was complaining of pain in the left loin, radiating to the left iliac fossa, which had been present at intervals for seven years and was occasionally severe. Scalding on micturition occurred at times. The patient passed urine once or twice during the night. The diurnal frequency of micturition was normal.

On examination definite tenderness was present in the left loin. The left kidney was easily palpable. The prostate gland was slightly enlarged, soft and mobile. A cystoscopic examination was made. Moderate chronic cystitis and slight intravesical projection of the prostate were found. Urine from the left kidney contained 20% pus, and the pyelogram of the left side revealed pronounced pelvic dilatation. The left kidney was practically functionless; the right kidney was normal.

At operation on May 3, 1937, left nephrectomy was performed. A large pyonephrosis with extensive adhesions was present. The ureter was enormously dilated and thickened. It was followed down to the brim of the pelvis and divided as low down as possible. At this point it was still almost the size of the small intestine. The patient's convalescence was uninterrupted.

The pathological findings were pyonephrosis, *pyelitis cystica* and *ureteritis cystica*. The pathological specimen demonstrated showed these features clearly. Dr. Walker Smith said that the ætiology of the condition was interesting, as there was no evidence of organic obstruction. It was probably a congenital hydronephrosis caused by neuromuscular incoordination, with superadded infection and ultimate destruction of the kidney.

The second patient from whom Dr. Walker Smith showed pathological specimens and skiagrams was a male, aged fifty-three years, who had been admitted to hospital on December 3, 1936. He had complained of hæmaturia and of great difficulty in and frequency of micturition, of three weeks' duration, with terminal pain referred to the perineum. There was a constant dull ache in the suprapubic area, worse on exertion. The patient had had a Neisserian infection at the age of sixteen years. A stricture was treated two years later. His urine had been cloudy ever since. Several attacks of hæmaturia had occurred during the past fourteen years, with frequency and difficulty of micturition at intervals.

When the patient was examined, a poor, dribbling stream of blood-stained urine was passed with great difficulty. The urine contained blood, pus and motile bacilli. The bladder was not distended and the kidneys were not palpable. A hard, tender mass, the size of a Brazil nut, was felt in the perineum, and on rectal examination a stony hard mass, larger than a golf ball, was evident in the prostatic region. The blood urea content was 36 milligrammes *per centum*. A plain skiagram revealed a very large pear-shaped shadow behind and above the *symphysis pubis*; this was thought to be a calculus in the prostatic urethra. Above this was a smaller shadow, probably a vesical calculus, while below the *symphysis pubis* there was another large opacity, which was obviously due to a stone in the bulbous urethra. A urethral bougie could not be passed beyond twelve centimetres.

Operation was performed on December 7, 1936. The vesical and prostatic calculi were removed by the suprapubic route and the urethral calculus by perineal section. A stricture distal to the site of the urethral stone was dealt with. A suprapubic tube drained the bladder for three weeks and a catheter was not tied into the urethra.

The vesical calculus was found to be composed of phosphates, but the prostatic and urethral calculi were composed of oxalates. The large stone weighed three ounces and the urethral calculus weighed one ounce.

A 12/14 English bougie was passed before removal of the suprapubic tube and again a few days before the patient's discharge on January 16, 1937. Dr. Walker said that the patient had been last seen on September 23, 1937, when he passed urine without difficulty and a large bougie entered the bladder easily. A remarkable feature of this case was that the renal function was normal in spite of large calculi in the prostatic and bulbous urethra.

Dr. Walker Smith finally discussed the clinical history of a male patient, aged thirty-two years, who had been admitted to hospital on February 18, 1938. He complained of hæmaturia that had occurred one week earlier, after he had jumped off a bench. The bleeding was accompanied by an attack of renal colic. The hæmaturia had persisted until his admission to hospital. Frequency of micturition was normal. An aching pain had been present in the left loin for twelve months.

On examination tenderness was present in the left costovertebral angle. The left kidney was palpable. The urine contained 10% of pus and 20% of blood. *Bacillus pyocyaneus* was grown on culture from the urine.

A cystoscopic examination was made. The bladder was normal, except for slight basal cystitis. Dark blue urine was excreted from the right ureteric orifice four minutes after an intravenous injection of 0·4% solution of indigocarmine. The blue dye appeared from the left orifice in four and a half minutes, but the colour was less intense than that from the right orifice.

The plain skiagram revealed numerous opacities in the left renal area; a pyelogram proved these to be calculi. The pelvis and calyces were dilated to a pronounced degree. One large calculus occupied the renal pelvis, and about fifty small rounded calculi were evident in the dilated calyces. An excretion pyelogram showed the right kidney to be normal. It was thought unwise to catheterize the right ureter, as the left kidney was grossly infected with *Bacillus pyocyaneus*.

At operation on February 28, 1938, left nephrectomy was performed. A large tumour was soon apparent, and two pints of purulent fluid were aspirated after the wound had been packed off. The kidney was then removed. The patient was discharged on March 20, 1939. His convalescence was uninterrupted and his urine was sterile.

A pathological examination was made of the left kidney. It was a calculous pyonephrosis with extensive perirenal adhesions. In the specimen shown by Dr. Walker Smith there was only a small portion of normal renal tissue at the lower pole. The remainder of the kidney was greatly dilated and contained numerous calculi. The large calculus had obviously caused obstruction at the ureteropelvic junction.

Dr. Walker Smith remarked that it was interesting to note that the patient had not been unduly troubled until he fell off the bench. Again, it might be thought that it would have been better to drain the kidney and proceed to nephrectomy later; but it was realized that effective drainage would have been very difficult to institute in this particular instance, as a glance at the specimen would show. The patient was gravely ill and absorption would have continued unless really effective drainage had been provided.

Frontal Lobe Tumour.

DR. R. A. MONEY showed a male patient, aged twenty-eight years, who had been referred to him by Dr. Edye and Dr. Dick. He was suffering from a tumour of the right frontal lobe, diagnosed as *glioblastoma multiforme*. Three months prior to examination he had begun to complain of headaches and attacks of dizziness, which were increasing in frequency and severity. One month later, after a very severe attack of dizziness, he had become

unconscious; and two weeks prior to examination he had lost the sight in his right eye and developed a feeling of numbness in the left upper extremity. His station became very unstable, and he was not able to stand without falling backwards.

Examination revealed bilateral papilloedema, more pronounced in the right eye, which was practically blind. The patient's mental condition was clouded and he could not cooperate sufficiently for an estimation of his fields of vision. At times he was euphoric and did not realize the seriousness of his illness. There was a slight degree of facial weakness on the left side, with increased reflexes and bilateral ankle clonus, but the plantar response was flexor in type.

Lumbar puncture yielded clear cerebro-spinal fluid under a high pressure of 300 millimetres of water. The other investigations revealed no abnormality. Encephalography was performed and showed that the anterior horn of the right ventricle was almost completely obliterated and that there was a filling defect in the anterior portion of the third ventricle. A rightsided transfrontal craniotomy was performed and a large tumour was found occupying the anterior portion of the frontal lobe on that side. The tumour, together with the neighbouring portion of the frontal lobe, was removed.

After operation the patient had a normal convalescence and the papilloedema gradually subsided. The vision in the right eye, however, remained extremely poor, on account of optic atrophy. Up to the time of the meeting (six months after operation) the patient's condition had remained satisfactory, although his vision was poor. The anterior portion of the frontal lobe containing the tumour and the encephalograms were demonstrated. Dr. Money remarked that in view of the pathological nature of the tumour the ultimate prognosis for the patient was not good, and recurrence was likely.

Tumour of the Third Ventricle.

Dr. Money's second patient was a male, aged sixteen years, who was suffering from polar spongioblastoma of the third ventricle. Some eighteen months prior to the meeting he had been admitted to hospital suffering from concussion after a minor head injury, and apparently had been quite well before this. Routine X ray examination of the skull, however, revealed evidence of greatly increased intracranial pressure of long standing, and examination of his fundi revealed early papilloedema. After the injury he began to suffer from headaches and attacks of vomiting.

Percussion of his skull yielded a definite "cracked pot" sound; nystagmus was noticed on lateral gaze, and instability on an attempt to stand on one leg alone. In view of these findings a diagnosis of cerebellar tumour was made and seemed to be confirmed by the finding of bilateral enlargement of the ventricular system prior to operation. However, when a suboccipital craniectomy was performed no definite abnormality could be found in the posterior fossa. Some relief followed this decompression; but the patient developed a large suboccipital bulge, which disappeared after evacuation of clear yellow fluid by lumbar puncture, only to fill up again in a few hours. Accordingly, one month after operation, ventriculography was performed, after the injection of "Thorotrast" into each lateral ventricle. This showed that the ventricles were somewhat unequal and irregular in size, and that they did not communicate with each other nor with the third ventricle. This led to a diagnosis of third ventricle tumour, and at a second operation a large right-sided fronto-parietal bone flap was raised and an opening made through the frontal lobe into the right ventricle. Inspection of the ventricular cavity then revealed a large semicystic tumour appearing through the interventricular foramen from the third ventricle. The cystic portion was evacuated and some of the solid part of the tumour was removed and the remainder was destroyed as far as possible with endothermy. The pathological examination of the solid portion showed it to be a polar spongioblastoma, which was regarded as being a radio-sensitive type of tumour. A full course of deep X ray therapy was then given by Dr. H. Ham, and the patient made a remarkable recovery. His condition had improved consistently and he was able to work fifteen months after operation, without evidence of recurrence. Dr. Money also showed plain skiagrams and ventriculograms.

Parasagittal Meningioma.

Dr. Money's third patient was a female, aged fifty years, who had been referred by Dr. Hunter Jamieson and found to be suffering from a right-sided parasagittal meningioma. For four years prior to operation she had been suffering from Jacksonian fits, characterized by twitchings which began in the left foot and extended up the left leg, and then spread to the left upper extremity. She always had an aura of pins and needles in the left foot, and she had never lost consciousness in any of the attacks. Recently the left lower extremity had become weak and she had noticed that her vision was blurred. Some mental dulness and drowsiness were also complained of.

Examination revealed a definite paresis of the left lower extremity, with exaggeration of reflexes, ankle clonus and ataxia. The plantar response was extensor in type. There was also a loss of sensation of passive position and movement in the left foot, and the patient had a tendency to fall towards the left side. She was unable to stand on her left leg alone. Papilloedema was present in both fundi, but the fields of vision were quite normal.

Lumbar puncture yielded clear fluid under an increased pressure of 170 millimetres of water, and with a protein content of 40 milligrammes *per centum*. As the plain X ray films revealed no pathological lesion, encephalography was performed; this showed that the body of the right ventricle was much flattened out and depressed below its normal situation, as though a tumour were present above and medial to it.

Operation was performed in two stages and a large parasagittal meningioma about the size of a tennis ball was removed from the junction of the falx and the longitudinal sinus, in the region of the right post-central gyrus. After operation the patient had a complete hemiplegia of the left upper and lower extremities, which had gradually cleared up, except for some slight weakness and spasticity in the left foot and ankle. An infection of the wound with *Staphylococcus aureus* delayed her convalescence. The Jacksonian fits had not yet altogether disappeared, but they had become very much milder and less frequent. Dr. Money said that in view of the large size of the tumour and the length of time for which it had been present, some permanent damage had probably occurred to the cerebrum in its vicinity, resulting in gliosis, and it was doubtful whether a complete recovery would take place. Dr. Money showed the tumour and encephalograms.

Spinal Tumour.

Dr. Money's fourth patient was a male, aged forty years, who had been referred to him by Dr. Eric Susman and Dr. Richards, and who had been found to have a tumour of the spinal cord. For about five years he had been suffering from pain in the lower part of his back and extending down the left thigh to the foot. For about a year he had noticed some weakness in the left leg and could not stand or walk on it for any length of time without considerable discomfort. He was unable to get up on the toes of his left foot, and just recently had noticed some hesitancy on micturition.

Examination revealed much wasting of the muscles of the left calf; the ankle jerk was absent and the patient was unable actively to plantar flex the left foot. No definite area of anæsthesia could be demonstrated.

Lumbar puncture was performed and yielded faintly yellow cerebro-spinal fluid; this contained 40 milligrammes *per centum* of protein and an increased amount of globulin, without any increase in the cells (Froin's syndrome). Lipiodol injected through the *cisterna magna* revealed a block at the level of the first lumbar vertebra. Laminectomy was then performed and a tumour was found growing from the lower end of the *conus medullaris*, in

the vicinity of the *filum terminale*. It was removed intact, and pathological examination showed it to be an angioblastic meningioma. Dr. Money showed the tumour, together with an X ray film illustrating the blockage of the lipiodol.

After operation, which had taken place nine months previously, an immediate relief of pain had occurred; but recovery in the muscles of the calf had been much slower and was not complete at the time of the meeting, although the patient was able actively to plantar flex his foot.

Intracranial Angioma and Cirsoid Aneurysm of the Scalp.

The next patient shown by Dr. Money was a male, aged thirty-four years, who had been referred to him by Dr. C. G. McDonald. He was suffering from a large cirsoid aneurysm of the scalp and an intracranial arterial malformation.

When first seen about six months prior to the meeting the patient had complained of weakness in the legs and inability to walk, with a staggering gait, of about three years' duration. He was extremely giddy on bending forward, and had a sensation of falling backwards when he stood up. He also complained of severe headaches in the left parieto-occipital region and of paræsthesiæ in both lower extremities. Recently some mental changes had been noted and his memory had become very bad. His speech was also slow and hesitant and staccato in type.

Examination revealed a large cirsoid aneurysm of the scalp, which was ulcerating in the centre, the result of two "ring-barking" scalp operations performed elsewhere. Pronounced signs of cerebellar disturbances were noted, especially nystagmus, incoordination, intention tremor, ataxic gait and Rombergism. A loud systolic bruit could be heard all over the head, especially well in the left occipital region.

Whilst the patient was in hospital numerous applications of diathermy had been given to the ulcerated area of his scalp, which had now practically healed, and from which pulsations had disappeared. Ligature had been performed of the left vertebral artery, both occipital arteries and both external carotid arteries above the origin of the occipital arteries. As a result of these procedures the patient's cerebellar functions had improved somewhat. Although his gait was still ataxic he was able to walk and look after himself. Nystagmus was still present, but the intention tremor had decreased. The bruit, although not so loud, could still be heard in the occipital region. Dr. Money said that when the area of the patient's scalp had completely healed it was intended to make a further attempt with arteriography and "Thorotrast" to localize the vascular abnormality which was responsible for the patient's symptoms. Analysis of the blood from the jugular vein showed that it contained an excess of oxygen when compared with venous blood from the other parts of the body, so that some form of intracranial arteriovenous aneurysm was suspected.

Hyperhidrosis.

The sixth patient shown by Dr. Money was a female, aged fifty years, who had been referred to him by Dr. A. L. Dawson and Dr. T. M. Greenaway. She was suffering from hyperhidrosis of the head, neck and upper extremities. For many years she had been an invalid, owing to an injury to her spine, caused by a fall from a chair. This was supposed to have produced a condition of spondylitis, and she had worn a spinal jacket ever since.

About two years earlier she had noticed excessive sweating of the right side of her forehead and face. This condition then spread to the right side of her neck, the right shoulder and the right upper limb. More recently the left side of her face and the left upper limb had become affected also. The sweating was very profuse and occurred even in cold weather. It was made worse by any emotion or excitement.

When the patient was examined the hyperhidrosis was very noticeable on all occasions. A trial injection of alcohol into the right stellate ganglion gave unilateral relief from the sweating for a period of about two weeks, and accordingly bilateral ganglionectomy of the stellate ganglia was performed via the anterior cervical approach. This afforded complete relief from sweating over the head, neck, shoulders and hands; but subsequently hyperhidrosis appeared along the inner borders of the arms and forearms and over the rest of the body in the areas not denervated of their sympathetic fibres by the operation. This latter manifestation had not responded to treatment by drugs administered to paralyse the sympathetic nerve endings to the sweat glands, and it was thought that there was a large psychological element present in this case. Dr. Money remarked that although it would be possible to denervate the upper limbs by removal of the second and third thoracic sympathetic ganglia, it would obviously be impossible to denervate the entire body.

Trigeminal Neuralgia.

Dr. Money then showed a male patient, aged forty-five years, who had been referred to him by Dr. Edye. He was suffering from right-sided recurrent trigeminal neuralgia. The condition had first appeared about fifteen years previously and had been limited to the maxillary division of the right trigeminal nerve. Operation by the subtemporal route had been performed eight years previously, when the maxillary division of the trigeminal ganglion had been divided. The symptoms had been relieved for three years. Four years prior to the meeting alcohol injections had been given elsewhere without relief, and recently the attacks had recurred with increasing severity and had spread to involve the ophthalmic division as well.

As operation had previously been performed through the subtemporal approach and alcohol had been injected, it was felt that the anatomy of this region would be rather difficult to determine. It was therefore decided to divide the sensory root via the suboccipital approach advocated by Dandy. This operation was accordingly performed and the sensory root of the right trigeminal nerve was completely divided close to the pons. Since operation, eight weeks previously, the patient had been free from pain. There was complete anæsthesia of the right cornea, so that protective goggles had to be worn to prevent the onset of keratitis.

Dr. Money also showed two other patients who had been suffering from right-sided trigeminal neuralgia and who had obtained relief from their symptoms following an injection with alcohol of the right trigeminal ganglion. In each case it had been necessary to inject the ganglion itself, owing to the fact that pain had occurred in the ophthalmic as well as in the maxillary divisions. In one case the injection had been carried out one year prior to the meeting, and in the other case three weeks.

Dr. Gilbert Phillips also showed a female patient, aged thirty-five years, who had been suffering from paroxysmal attacks of pain in the right side of the face for several years. She had become extremely depressed and had made two attempts at suicide. The pain was particularly confined to the distribution of the right mandibular nerve. In 1935 the Gasserian ganglion was exposed by the temporal route and the lower half of the sensory root was divided as far back as possible. After the operation she had been completely free from pain and had gained two stone in weight during the next four months.

About March, 1938, the pain appeared for the first time in the right infraorbital nerve distribution. This nerve was injected with 90% alcohol and the patient remained free from pain until September, 1938, when pain appeared in the whole of the right maxillary division.

On November 24, 1938, the Gasserian ganglion was again exposed by the temporal route and about half the remaining fibres of the sensory root were sectioned, approximately the upper quarter of the sensory root being left intact. After this operation the patient had had no further pain.

Dr. Phillips said that the result of the operation illustrated Dandy's hypothesis well. Dandy held that pain fibres from all three divisions of the trigeminal nerve passed into the lower portion of the sensory root on

their way to the nucleus of the trigeminal nerve. It was noted after the second operation, after which only the upper portion of the sensory root had been left intact, that although the patient was quite free from pain and experienced no painful sensation when the right side of the face was pricked with a pin, nevertheless the right corneal reflex was intact and touch sensation was present over the whole of the right side of the face.

Pituitary Tumour.

Dr. Money also showed a series of X ray films and charts of fields of vision on the Bjerrum's screen from three patients suffering from pituitary tumour.

The first patient was a female, who had the characteristics of acromegaly and who suffered from intense headache and advanced visual field defects, so that she could see only in the nasal half of one eye.

The second patient was a male, who showed signs of hypopituitarism. The X ray films, however, showed tremendous ballooning of his pituitary fossa, and examination of the visual fields revealed a complete bitemporal hemianopia. This had remained stationary for ten years and he had no headaches.

The third patient was also a male, who showed a mixed degree of hyperpituitarism and hypopituitarism. X ray films revealed destruction of his pituitary fossa, but his visual fields were perfectly normal. He suffered, however, from intense and unbearable headaches.

DR. GILBERT PHILLIPS showed a male patient, aged forty-seven years, who had been referred to him by Dr. Spearman. This man had a definite dyspituitary appearance. The skin of the face was relatively hairless, waxy and myxomatous to feel. He was complaining of severe bilateral frontal headaches and of loss of potency. An X ray examination of his skull disclosed pronounced erosion of the *sella turcica*. Examination of the visual fields revealed an early upper quadrant bitemporal hemianopia. A diagnosis of chromophobe adenoma of the pituitary gland was made.

In January, 1938, the sella was approached by the transsphenoidal route, the floor of the sella removed and the adenoma gently drawn down into the sphenoidal sinus. After this procedure the visual fields returned to normal and the frontal headaches disappeared. The patient was quite well for three months, but then returned, complaining of right temporal headaches. He stated that he had had these right temporal headaches for many years, but he had not paid much attention to them, as he thought they were related to a kick on the head from a horse about twenty years ago.

Encephalography was performed, but no cerebral injury was detected on the right side, although the right temporal bone appeared to be somewhat depressed and looked as though it might have been the site of an old skull fracture.

On April 6, 1939, the right temporal muscle was lifted from the bone and an old depressed fracture was exposed. When this was lifted it was found that the middle meningeal artery had been involved in the fracture and was tightly adherent to a number of small bone fragments. This artery was ligated. The patient made an uneventful recovery and had had no headaches since the operation. He had been having, during the past two years, a number of "turns" at night time, which were suggested to have been of the nature of *petit mal*. However, investigation indicated that these probably had a psychological basis.

Meningioma of the Spinal Cord.

Dr. Phillips next showed a male patient, aged forty years, who had been referred to him by Dr. H. Ritchie. He presented himself complaining of pain radiating around his right side from the mid-line of the back to the umbilicus. For some months he had noticed that his legs had become rather stiff and weak after he had sat for any length of time in one position, as, for instance, driving a motor car. In the past few weeks he had noticed definite weakness and incoordination of the lower extremities; his gait was very ataxic on the day of examination and he was able to walk only with difficulty. There was no history of disturbance of micturition.

Examination after a lipiodol injection disclosed a partial block at the level of the ninth and tenth thoracic vertebræ.

On December 1, 1938, laminectomy was performed and disclosed an extramedullary tumour on the right side; the tenth dorsal sensory root was running across the posterior aspect of the tumour. This root was sectioned, and the tumour, which was the size of a large walnut, was removed in one piece. Histologically the growth was a meningioma.

The patient made an uneventful recovery, and at the time of the meeting had no signs or symptoms and had returned to his usual occupation.

Ligamentum Flavum Syndrome.

Dr. Phillips also showed a male patient, aged twenty-eight years, who had been referred to him by Dr. S. Scougall. He had a history of pain in the back and left leg, which came on following an attempt to lift a heavy load of firewood. The pain radiated down the back to the left leg and into the sole of the left foot.

On examination considerable blunting of touch sensation over the left leg was noticed and the left ankle jerk was absent. Lumbar puncture disclosed cerebro-spinal fluid under normal pressure. Examination after lipiodol injection revealed definite notching between the fourth and fifth lumbar vertebræ on the left side in the antero-posterior view, but not in the transverse view.

On March 15, 1939, this region was exposed by laminectomy and pronounced thickening of the *ligamentum subflavum* at the intervertebral foramen, between the fourth and fifth lumbar vertebræ, was seen. The ligamentum at this point was approximately five millimetres thick. This was removed, and œdematous fourth and fifth lumbar nerves were brought into view. The anterior aspect of the dura was examined; no *nucleus pulposus* was seen, but a pad of very vascular fatty tissue was situated over the posterior aspect of the intervertebral disk. Attempts to remove this produced profuse bleeding and had to be abandoned. At the conclusion of the operation the fourth and fifth lumbar nerves on the left side appeared to be quite free from pressure. The patient made an uneventful recovery and returnd to work. Dr. Phillips said that a letter received during the week stated that he was completely free from pain.

Spina Bifida Occulta.

Dr. Phillips's next patient was a female, aged forty-five years, who had been referred by Dr. Arthur Morrow. She had been complaining of a burning pain in the outer side of the right leg and right foot for some months. The outer aspect of the right leg was exquisitely tender to touch; she was unable to wear a stocking on this leg and had to pin her frock up so that it would not brush against the skin. There were no abnormal findings on clinical examination.

An X ray examination of the lumbar portion of the spine disclosed a *spina bifida occulta* at the level of the fifth lumbar and first sacral vertebræ. The skin over this area was rather thicker than normal, was slightly more hairy than the surrounding skin and contained small congeries of minute veins.

On May 1, 1939, operation was performed, the incision passing down to the laminæ through a large lipomatous mass of tissue. The laminæ of the fifth lumbar vertebra and of the first and second sacral vertebræ were found to be fibrous and were removed. When the dura was exposed the fibrous band was seen passing round the dura. This band was about two to three millimetres wide, and was constricting the dura, like a tight belt. On the right side the lower margin of this band was compressing and had altered the course of the fifth lumbar mixed nerve trunk. The band was sectioned and the nerve trunk, which was quite œdematous, was freed from traction.

After operation the patient developed a small trophic ulcer on the skin over the lower part of the sacrum. This healed up satisfactorily under treatment. Dr. Phillips said that during her convalescence she developed several

attacks of severe pain in the original situation; but she had reported the week prior to the meeting that the pain had disappeared entirely and she was able to wear a stocking on the right leg for the first time in many months.

Dr. Phillips next showed a boy, aged fifteen years, who had been referred by Dr. H. A. Sweetapple. For as long as he could remember he had had nocturnal enuresis every night. No abnormal physical signs were found on examination.

An X ray examination of the lower lumbar part of the spine disclosed *spina bifida occulta* at the level of the fifth lumbar and first and second sacral vertebræ.

On March 9, 1939, laminectomy was performed and it was found that the fibrous lamina of the first sacral vertebra was considerably thickened anteriorly, so that it produced considerable local kyphosis, around which the *filum terminale* was tightly stretched. When this fibrous lamina was removed the *filum terminale* became quite slack. It was thought that this traction on the *conus medullaris* through the *filum terminale* was probably the cause of the enuresis. Nothing else was done. After operation the patient had one attack of nocturnal enuresis in the succeeding fortnight. He was discharged from hospital and had reported subsequently that he had about one attack every ten days.

Sympathectomy for Essential Hypertension.

Dr. Phillips showed a blood pressure record indicating the value of "Avertin" anæsthesia as an index of the amount of fall in blood pressure which might be expected after section of the splanchnic nerves. The patient was given a basal dose of "Avertin"; his systolic blood pressure fell from 220 to 115 and his diastolic pressure from 120 to 80 millimetres of mercury. After operation on May 11, 1939, the systolic blood pressure fell from 230 to 180 and the diastolic pressure from 125 to 110 millimetres of mercury.

Adie's Syndrome.

The next patient shown by Dr. Phillips was a male, a motor mechanic, who had noticed that six months earlier the sight of his left eye was becoming somewhat blurred. He also observed that the left pupil had become considerably larger than the right.

On examination the left pupil was found to be about twice the size of the right. It was circular and central, and reacted to light and on convergence. The pupil could be contracted well with "Eserine" and widely dilated with homatropine and cocaine. There were no other abnormal physical signs except pronounced diminution of both ankle jerks. There was no history of venereal disease. The blood and cerebro-spinal fluid both failed to react to the Wassermann test.

Dr. Phillips said that the syndrome had been described by Adie, who called the condition the tonic pupil. It might be differentiated from a syphilitic condition by several characteristics: it was always unilateral, the affected pupil was always larger than the normal pupil and could be dilated with mydriatics; the disorder appeared in association with an absence of reaction by blood and cerebro-spinal fluid to the Wassermann test. Adie had noted that this condition, which he described as a benign disease *sui generis*, was in many cases associated with bilateral diminution or absence of the knee or ankle jerks.

Petit Mal Treated by Brilliant Vital Red.

Dr. Phillips next showed a male patient, aged twenty-three years, to indicate the early results from the treatment of *petit mal* with intravenous injections of brilliant vital red, according to the method employed by Cobb and by Osgood and Robinson. The brilliant vital red was injected in a 1% solution, usually twice a week, in a dosage from 20 to 50 cubic centimetres, up to a maximum quantity of about two litres over a period of several months. The dye was non-toxic in these doses, but in some cases might produce albuminuria. The patient's skin became pink in colour and the tears, dandruff, optic disks and tympanic membranes were stained pink. It had been reported that after the early injections an increase in the number of attacks might be expected; but as the treatment proceeded the number of attacks decreased, and after the conclusion of the injections the patient might be free from attacks for periods up to two years or more. The dye was effective only in cases of *petit mal* and did not appear to influence major epileptic attacks.

Thyreotoxicosis.

DR. E. W. FRECKER showed three patients, all of whom had reported to the radiation clinic suffering from thyreotoxicosis. Each patient had been treated by X rays alone (200 kilovolts peak, filtered by 0·5 millimetre of copper). The general plan of treatment consisted in the administration of recurring series, each comprising six to eight applications of 150 *r*, given at the rate of two applications a week, with four to six weeks between each series. The whole thyreoid gland was included at each session, and the field was extended down over the *manubrium sterni* to irradiate the thymus at the same time.

The first patient was a young woman, aged twenty-five years, with the florid type of hyperthyreoidism associated with tremor and slight thyreoid swelling, but no exophthalmos. Her basal metabolic respiratory quotient fell from +28% to −6% after thirteen treatments extending over ten weeks. She had been ambulatory throughout, and at the time of the meeting felt completely well and had gained seven pounds in weight.

The second patient was a woman, aged fifty-six years, who had been admitted to the wards with signs of cardiac failure and swelling of the legs, presumably during an attack of fibrillation. When she began radiation treatment her basal metabolic respiratory quotient was +34% and her weight 117 pounds. After treatment her pulse rate was steady and regular at 92 per minute, her basal metabolic respiratory quotient +6%, and her weight 150 pounds. She had only seven treatments in nine weeks.

The third patient, a woman, aged forty-nine years, illustrated the need for persistence in really resistant circumstances. Beginning with a basal metabolic respiratory quotient of +47%, this patient, between November, 1936, and June, 1938, had sixty-one applications. The basal metabolic respiratory quotient finally fell to ±0%, though she gained only three pounds. She was feeling very well and had carried out her household duties during the period of her treatment. Such a long series of treatments was unusual; ordinarily two or three series of six applications each were sufficient.

Dr. Frecker pointed out that on all these patients, even the last, the irradiated skin presented a perfectly normal appearance. This at once disposed of the old bogy that irradiation made any subsequent surgery difficult. In any case, none of these patients seemed likely to require surgical assistance. The failures of radiotherapy occurred mostly when insufficient treatment was given, for almost invariably when radiation treatment was efficiently administered the basal metabolic respiratory quotient dropped, the patient's weight increased and the symptoms were steadily relieved.

Patients with acute symptoms needed small doses at first or otherwise excessive reactions occurred. Larger doses at each session could be given later on, as sedation occurred. Usually total doses in the region of 3,000 *r*, spread over a period of three months or so, were necessary for permanent control of the condition.

In comparing the results of radiation therapy with those of surgical operation, Dr. Frecker said that it should be remembered that surgery was in a stable well-developed condition, whereas radiation therapy was still slowly feeling its way towards improvement. A further point was that at the present time the surgeon was first consulted, and only those patients who passed the surgical sieve for various reasons reached the radiotherapist. Manifestly such clinical material was not the most favourable. It seemed fair, in the present state of knowledge, to affirm that fewer patients would need surgical operation if the benefits of radiation therapy were first exploited.

DR. HAROLD HAM showed a young married woman, aged twenty-three years, who had been referred to him in January, 1938, with thyreotoxicosis. Symptoms were said to have commenced nine months previously, after a confinement. She had lost seventeen pounds in weight. Symmetrical moderate enlargement of the thyreoid gland, mild exophthalmos and fine tremor were present. The pulse was rapid and regular, and the basal metabolic rate was +58%. Treatment consisted of three series of applications of deep X rays at monthly intervals. In each series three doses of 200 *r* were given in one week, direct to the thyreoid. The other technical factors were the following: the kilovoltage was 210 and milliamperage 25; the focal skin distance was 45 centimetres, and the dose was filtered through one millimetre of copper and one millimetre of aluminium. After an interval of three weeks the basal metabolic rate was again estimated and the question of further treatment was decided. The third and last series of treatments were given in the middle of March, 1938, and when seen on April 11 the patient was much improved and had gained seventeen and a half pounds in weight since February 4. The basal metabolic rate, which had been +75% two months previously, was −17%. She had remained very well since. On July 20, 1938, the basal metabolic rate was +4%, and the basal pulse rate 72 per minute; and on December 6 these figures were −4% and 80 per minute respectively. The patient's present weight was eight stone seven pounds, which she considered normal for her.

Carcinoma.

Dr. Ham also showed a man, aged forty-eight years, who had been referred to him by Dr. T. M. Furber in November, 1937, suffering from an extensive carcinoma of the mouth. The lesion was a proliferative type of epithelioma, which involved the right lower alveolus from the mid-line in front to the region of the third molar tooth behind, and extended onto the floor of the mouth and down into the right alveolo-labial sulcus. There was no definite involvement of the cervical glands. X ray examination of the right mandible revealed no bony involvement.

Commencing on November 8, 1937, deep X ray therapy was given to two ports, one directly lateral to the right jaw and one obliquely upwards to the right submaxillary region. The technical factors were the following: the kilovoltage was 210 and the milliamperage 25; the dose was filtered through three millimetres of copper and one millimetre of aluminium; the total dose to each port was 2,000 *r* in daily doses of 300 *r*.

In January, 1938, it was decided to use a radium dental applicator, specially made to fit the patient; and three teeth in the vicinity of the growth were extracted to facilitate fitting of the applicator.

Twenty-two milligrammes of radium were accurately applied over the lesion in this manner, and the patient wore the applicator without discomfort for nine hours a day for nine days. The dose on the mucosa was estimated at 8,000 *r*. The usual radium reaction followed, and then the lesion completely disappeared, leaving a smooth normal-looking mucosa. At the time of the meeting the patient was in excellent health and showed no evidence of malignant disease in the oral cavity and no evidence of involvement of the cervical glands. He was being kept under regular observation by Dr. Furber and by the radiotherapist. Dr. Ham pointed out that the result had been achieved without any operative interference whatsoever.

Dr. Ham's next patient was a woman, aged fifty-nine years, who had been referred to him in August, 1938. She had been under the care of another practitioner, and in the previous February had had an irregular area of superficial ulceration over the right lower alveolus. The Wassermann reaction had not been elicited. A swabbing taken from the ulcer revealed tubercle bacilli and Vincent's organisms. X ray examination of the chest revealed no abnormality. Subsequently a biopsy had been made on material from the edge of the ulcer at another hospital, and the pathologist reported "squamous epithelioma".

When the patient was first seen at the Royal Prince Alfred Hospital an extensive lesion, which appeared typical of epithelioma, occupied practically the whole of the surface of the right lower alveolus. In the floor of the mouth were an indurated area and a fixed gland mass in the submental region, 3·5 centimetres in diameter, with a discharging sinus in the centre.

From August 23 to September 9, 1938, the patient had deep X ray therapy applied laterally to the right jaw and to the submental region, fourteen treatments being given in all. The dose to each port was 2,400 *r*, 350 *r* being given daily. The other technical factors were the following: the kilovoltage was 210 and the milliamperage 25; the focal skin distance was 45 centimetres; the dose was filtered through three millimetres of copper and one millimetre of aluminium. At the time of the meeting the patient appeared well and showed no evidence of malignant disease. She was being kept under regular observation.

Medical Societies.

MELBOURNE PÆDIATRIC SOCIETY.

A MEETING of the Melbourne Pædiatric Society was held at the Children's Hospital, Carlton, Melbourne, on May 10, 1939, DR. D. O. BROWN, the President, in the chair. Part of the report of this meeting was published in the issue of August 12, 1939.

Œsophageal Malformations and Strictures.

DR. A. G. VILLIERS said that the occurrence of a rather unusual case of œsophageal stricture in one of Dr. Derham's patients had drawn attention to the clinical entities associated with pathological conditions of the œsophagus. Having Dr. Derham's permission to do so, she proposed to refer to the details of that patient's case, making it form the basis of some discussion of the more common types of œsophageal conditions from the radiological aspect. The child, eighteen months of age, had been a full-time baby, and had been fed mainly on breast milk to the age of ten months. No symptoms had been noted until the baby commenced to have educational diet at the age of six months. Vomiting had occurred continuously during meals and immediately afterwards; it was effortless and commenced after the intake of three or four teaspoonfuls of food. No abnormality had been found by routine examination, but by œsophagoscopic examination the presence of a stricture had been established fifteen centimetres from the incisor teeth, surrounded by œdema. A small piece of bone had been removed from it. A number 14 gum-elastic catheter was passed through the stricture. Radiographic examination revealed that thick barium was held up, but the thin barium gruel passed through the stricture. Major strictures were present at the levels of the sixth and seventh thoracic vertebral bodies, and three minor strictures were localized at lower levels.

With the assistance of lantern slides, Dr. Villiers outlined the development of the œsophagus, with special reference to three stages. At first the lungs were placed between the stomodeum and the stomach. Later the œsophagus formed as a tube divided by a septum, which united last of all at the lower end. The third stage was the stage of canalization. Abnormalities of development might be due to failure of the septum or failure of canalization. Under the former heading she placed three abnormalities: tracheo-œsophageal fistula, in which there was a failure of the septum to fuse; a common tube for both trachea and œsophagus; and blind pouch formation due to backward inclination of the septum. Dr. Villiers demonstrated the first of these abnormalities from a specimen obtained at autopsy and showed a skiagram to illustrate blind pouch formation. Failure of canalization might result in the separation of the upper and lower ends of the tube by a rod of tissue or by a mere membranous diaphragm, or it might result in stricture forma-

tion. Dr. Villiers went on to speak of pharyngeal diverticula consisting of remnants of visceral pouches or hernia, and also referred to traction diverticula and Leugert's pouch, in which a membrane stretched from bronchus to vertebræ.

Dr. Villiers said that Dr. Leonard Findlay had stated that diverticula in children were usually at the lower end of the œsophagus and were rare; all did not agree with his view that pulsion pouches were unknown in childhood. Dr. Villiers showed skiagrams prepared from two children and an adult to illustrate congenital short œsophagus, a condition thought to be normal in some children. The other group of hernia was known as para-œsophageal hernia.

Speaking of the numerous causes of obstruction of the œsophagus, Dr. Villiers said that though in children the principal cause of stricture was the swallowing of caustic soda, it was necessary also to think of congenital and infective causes and of lodgement of a foreign body. She illustrated the last-mentioned cause by reference to the case of a boy from whom a halfpenny had been recovered when he was said to have swallowed a shilling. She also quoted a case in which lodgement of a rabbit bone was diagnosed radiographically by means of cotton wool and barium. Cardiospasm, outside pressure and carcinomata were other causes. Dr. Villiers referred to numerous theories of cardiospasm; one such theory was that it might be due to diaphragmatic stricture or to a sympathetic nervous condition in which there was some want of synchronism of the mechanism of peristalsis in the œsophagus and cardiac sphincteric relaxation.

With further reference to the child under discussion, Dr. Villiers pointed out that Findlay had mentioned the common sites of obstruction as at the levels of the seventh and eighth thoracic vertebræ and at the cardia. He had classified the types of obstruction as (*a*) simple narrowing, (*b*) membranous diaphragm, (*c*) fibro-muscular thickening comparable with hypertrophy of the pylorus, and (*d*) spasm. In the case under consideration the diagnosis lay between true stricture and spasm. The radiographic and œsophagoscopic findings were against continuous spasm at the same sites; and œdema was present, with narrowing of the lumen to the size of the catheter passed. Dr. Villiers quoted the case of another child, who had had spasm up to the age of three years; this had disappeared when he was reexamined at the age of six years. The symptomatology in the case they were discussing was significant, and followed Findlay's classical description. The difficulty had appeared at the time of weaning; it was best described as regurgitation rather than vomiting, occurring during feeding and soon afterwards, only small quantities of food being taken. By contrast, cardiospasm commenced almost immediately after food; large quantities were taken in, and the regurgitation was intermittent, occurring at intervals of days or weeks.

Dr. Villiers concluded by stating that she had been able to come upon only one other case resembling that under consideration. The other patient, a boy, had had acute attacks of complete obstruction which went on to require gastrostomy. He had had a short œsophagus, and the stomach was partially intrathoracic. A point of great interest was that Dr. Reginald Webster had been unable at the autopsy to find anything like the degree of stenosis and dilatation of the œsophagus which had been demonstrated by radiography prior to operation. Hence the question arose, in the case of the first child, as to how many of the symptoms were due to spasm and how many to organic stenosis.

Dr. Raymond Hennessy said that he proposed to describe the clinical manifestations and discuss the treatment of corrosive strictures of the œsophagus, the usual cause of which was caustic soda. Some strictures of the œsophagus were congenital, some were acquired, and some were thrust on the patients through unskilful attempts to remove foreign bodies. He had looked through the records of the Children's Hospital for the past thirteen years during which he had been associated with the special clinic, and had ascertained that nineteen children had been under his care suffering from corrosive strictures. Over the same period he had had two such patients privately. The condition was one which entailed much suffering and was formerly regarded as almost invariably fatal. It had interested him to discover that it appeared to be much less common in the other States of Australia, and that only isolated cases occurred in London. On the other hand, it was very common in the United States of America, and Dr. Chevalier Jackson and other surgeons had been successful in having legislation passed with the object of minimizing it. Lye, used for scouring, was advertised as not harmful to the most delicate fabrics; but it contained 95% of caustic soda, and little children were apt to swallow it. The legislation introduced required that it should be sold in red packages and plainly labelled as poisonous; those measures had been taken in spite of the vested interests of the manufacturers, who feared that their sales would drop. Lye poisoning was also well known in countries like Germany and Hungary.

The method of treatment adopted at the Children's Hospital, Melbourne, in 1927, represented a distinct advance. In 1926 Dr. Gutteridge had seen it carried out at the Jackson Clinic and had returned to Melbourne with the details. Dr. Gabriel Tucker had introduced it at that clinic as a new form of treatment. Originally a permanent gastrostomy opening had been made and afterwards dilatation would be carried out, often by the passage of dilators not under vision—in other words, by blind bouginage. Trousseau had pointed out that all those patients died of the bougie sooner or later. Afterwards Jackson practised proximal dilatation under vision with his own special bougies. That was a decided advance from the point of view of safety; but it was possible only in a few cases to reach such a stage of cure as to dispense with the gastrostomy. Furthermore, it was unsuitable if there was, as often happened, more than one stricture. Tucker's method was retrograde dilatation. The explanation of its success depended upon his own cleverly designed bougies and also upon several facts which had been ascertained about the pathology of the strictures.

Mikulicz and Billroth had observed that, no matter where the entrance to the stricture, the exit was always concentric, funnel-shaped and in the centre of the lumen. Chevalier Jackson had discovered that the burning was rarely all round the lumen; there were islands of unburnt mucous membrane and muscle left in the damaged zone. Dr. Hennessy commented that, in connexion with the œsophagus, it should be realized that that organ was very muscular and had a peculiar facility for hypertrophy or hyperplasia of its muscle and mucosa; the unburnt portion, therefore, could be exploited almost without limit. The power of retroperistalsis (the vomiting mechanism) was also inherent in the musculature of the œsophagus, and almost as perfect as the propulsive movement.

Discussing present-day methods of treatment, Dr. Hennessy said said that they fell into two groups. The first was proximal dilatation under vision through an œsophagoscope, as practised by Chevalier Jackson. This method did not necessarily require gastrostomy. It was most satisfactory when there was only one stricture and that not very severe. Chevalier Jackson's bougies were the best. The second group was retrograde dilatation after gastrostomy, Tucker's special bougies being used. It was especially suitable when there were multiple strictures.

Referring to the pathology of the stricture, Dr. Hennessy emphasized that it was axiomatic that fibrous tissue could not be stretched; it was inextensible and inelastic. He also pointed out that the strictures were almost certain to be multiple. The œsophagus wound up the vertebral column, and so antero-posterior and lateral curves were present. Therefore it was inevitable that multiple strictures would be in different planes, so that only the proximal stricture could be dilated under vision—an essential consideration for safety. It was a fact that larger bougies could be pulled up through the stricture from the stomach than could be pushed down through the stricture from the mouth.

Dr. Hennessy then proceeded to describe the Tucker method and the use of the Tucker bougies. He gave as a

typical example a child brought into hospital with burns on the lips, the mouth and the pharyngeal wall, in a state of shock and unable to swallow. After four or five days an attempt would be made to assess the extent of the damage to the œsophagus, if any. If the burns were beyond those known as third degree, the patient died about ten days after the injury, of mediastinal sepsis due to the sloughing of the œsophageal wall. If the burns were less severe, the patient began to swallow after two or three weeks; but after a further three weeks or so dysphagia again developed. Then was the time to begin investigation and treatment. Œsophagoscopic examination at that stage revealed granulation tissue with odd islands of undamaged tissue. Proximal to the site of the burn, areas of swollen, œdematous, rugose and sometimes ulcerated epithelial œsophageal mucosa were seen. Not much scarring was present at that time, because the burns had not yet healed. When that state of affairs was revealed by œsophagoscopy there should be no delay in submitting the patient to gastrostomy. By putting the œsophagus at rest a favourable opportunity was allowed for healing of the ulcerated areas. Most of the food was given through the tube till healing occurred, usually after a period of about two weeks. The damaged areas began to heal after the gastrostomy was performed and the œdema rapidly subsided; with the gastrostomy feeding the child's condition improved rapidly. When the damaged area was examined through the œsophagoscope some two or three weeks later it was seen to have healed.

Dilatation was then begun, about fifteen or sixteen weeks after the injury. The first step was to induce the child to swallow a piece of cotton or Pearsall's braided silk. To do that, the silk was passed through the nose and allowed to dangle down behind the uvula in the pharynx. As that was behind the posterior pillar of the fauces the child could not pull it out, and as it was within the grip of the constrictors it was swallowed unwittingly. After two or three days it would have passed through the stomach to the duodenum. That was estimated by the amount of thread which had been played out. Without any need for anæsthesia, the thread was fished out through the gastrostomy wound and the distal end was discovered. The proximal end was joined to the end outside the nose, a continuous loop being made. In the next phase of the treatment the stricture was dilated upwards by bougies pulled through the gastrostomy wound, the stomach, the stricture, the pharynx and out through the mouth. Dr. Hennessy said that it was wise to hold the bougie in the stricture for about ten or fifteen minutes. That allowed the œsophagus to work on the bougie in an endeavour to propel it upwards, and thus afforded an opportunity for the unburnt musculature in the constricted area to hypertrophy. The child tried to vomit the bougie. Dilatation was usually carried out twice a week for three or four weeks, the size of the bougie being increased from time to time. Dr. Hennessy remarked that by means of the œsophagoscope on a healed stricture approximately one year after the injury it might be seen that the burnt area had been considerably overgrown by healthy tissue. For example, an area regarded as "scarred 60%, unscarred 40%" might a year later be reported as "scarred 10%, unscarred 90%".

With reference to the gastrostomy wound, Dr. Hennessy said that it could be kept open for two years or longer without trouble. Of course it was never used for feeding after the first fortnight, but was maintained solely for the bouginage. He aded that dilatation was carried out twice weekly for about one month during the first year at intervals of three months. During the second year the dilatations were not necessary more than every four months, and after that the patient was usually cured. Dr. Upjohn had suggested the use of a collar threaded onto a catheter in the gastrostomy wound. The collar kept the catheter tightly in position on the abdominal wall and so no leakage occurred. Dr. Hennessy also referred to the use of an ointment advised by Dr. Byron Stanton, by means of which the skin around the stoma was kept healthy. The dental condition of the children undergoing treatment was worth consideration. They were shedding their temporary teeth, which often decayed and were lost prematurely. The second teeth should be carefully tended so that the most efficient masticating apparatus was assured for the child when he grew up, because he would always have to chew carefully. Dr. Hennessy also referred to the carnivorous habits of small children, who were prone to wolf food in lumps. Vegetable and pieces of apple sometimes proved too great a strain for the swallowing powers of the damaged œsophagus, and even a pea might become stuck. He added that as the children grew older and learned to masticate their food, misadventures occurred less frequently.

Dr. Hennessy said that he had had some of the patients under observation for ten years. He favoured Tucker's method because it afforded a much better chance of nearly perfect restoration of structure and function. He regretted that he had no children present at the meeting; but as many of them lived in the country and there was very little to see on external examination he had not considered their presence necessary. In conclusion he mentioned that though the work to which he had been referring represented a small branch of surgery, he thought the results obtainable should be explained to members of the society, because they would agree that a child with a permanent gastrostomy was at a serious social disadvantage. The administration of adequate nourishment for growth and development was difficult when all food had to be given through a gastrostomy tube.

DR. COLIN MACDONALD thanked Dr. Villiers and Dr. Hennessy for their important contributions to the discussion. He said that he had been present at a demonstration by Dr. Tucker and had heard of the great impression Dr. Tucker had made at the Mayo Clinic. Dr. Macdonald said that the normal epicardiac portion of the œsophagus had to be differentiated carefully in the films and that cardiospasm and achalasia were poor terms. Constriction occurred at the diaphragmatic opening and not at the cardia. Dr. Jackson was in the habit of referring to "failure of the pinch-cock". Spasm might be due to the presence of a small foreign body in the œsophageal wall.

DR. E. R. CRISP stated that in a period of two months at the Royal Melbourne Hospital he had seen six instances of para-œsophageal hernia; though it was not of great importance, he wondered whether anyone could give any information as to the frequency of its occurrence.

DR. E. HUGHES JONES, speaking of cardiospasm or achalasia of the œsophagus, expressed the opinion that pinch-cock action of the diaphragm had nothing to do with it and that the constriction was not always at that point. Histologically it was demonstrable that the submucous ganglion plexus of the lower end was destroyed. Failure occurred in the normal tone of the fibrous layer holding the surfaces in apposition, and it might take as much pressure as that exerted by eight inches of water to force the lumen open. It was not clear whether cardiospasm was a state of spasm or a failure in relaxation. Knight had produced cardiospasm by dividing the vagus, but none by sympathectomy; but it should not be overlooked that ganglion cells were present in dogs which were absent from humans. The left gastro-pancreatic ligament contained all the sympathetic fibres to the lower end of the œsophagus. Souttar had advocated treatment by sympathectomy; but in his experience improvement after operation was only temporary.

DR. KATE CAMPBELL supplied some further information about the first child whose condition had been described by Dr. Villiers. The baby was normal to the age of eight months, and vomited intermittently from the time that thickened feedings were first given. The vomitus was very thick and full of mucus; and the baby had almost drowned in the mucus, but might go for as long as six weeks without vomiting. The condition always responded to the use of a stomach tube weighted with mercury; it had not improved with acetylcholine, and other medical treatment had failed. Dr. Campbell felt sure that some spasm must be present.

DR. H. C. COLVILLE said that the Gabriel Tucker procedure introduced to Melbourne by Dr. Gutteridge had become the established procedure at the Alfred Hospital. He considered that Dr. Hennessy was too dogmatic when he stated that fibrous tissue could not be stretched, and indeed he was of the opinion that the stretching was partially responsible for the cure. Further fairly complete encirclement occurred in some cases. Though under the older régime he had encountered cases in which dilatation could not be carried out and cure could not be effected, with the newer routine treatment he had not encountered a patient who would not respond to treatment. Dr. Colville also disputed the insular arrangement of the damage to the surface of the œsophagus. In his experience, after a gradual process of dilatation over a number of weeks, there was a sudden "let up" of the stricture; and if medium-sized dilators were used the stricture rapidly gave way, allowing the surgeon to "step up" to the large dilators quickly. That experience accounted for his view that the fibrous tissue must give way.

DR. H. DOUGLAS STEPHENS asked Dr. Hennessy for information concerning the criteria for closing of the gastrostomy wound.

Dr. Hennessy, in reply to Dr. Stephens, said that when the child was gaining weight and growing, and had been eating normal food for a year, when dilatation had not been needed for six months and by œsophagoscopy it had been found that the damaged site was of satisfactory appearance, healed and pliable, the time had arrived when the gastrostomy opening should be closed.

DR. D. O. BROWN, from the chair, said that he had seen Dr. Hennessy's patients at the hospital for the past ten years, and the results were as good as could be hoped for. The surgeons were grateful to Dr. Hennessy and to Dr. Gutteridge and others who had perfected the procedure at the hospital.

Extensive Primary Nerve and Tendon Suture at the Wrist.

DR. RUSSELL HOWARD reported two cases of extensive primary nerve and tendon suture at the wrist (see page 322).

DR. H. DOUGLAS STEPHENS congratulated Dr. Howard upon his handling of the cases and on the meticulous care in the after-treatment, which had produced excellent results.

DR. ERIC E. PRICE also congratulated Dr. Howard. He referred in detail to three factors which influenced the surgeon in deciding upon treatment in the type of case under consideration. The anatomical peculiarities of the tendon, such as the degree of differentiation and the gliding mechanism, comprised the first factor; in the cases under discussion the tendons were flat and easily sutured, had unimportant surroundings, and subserved undifferentiated functions. When tendons passed through an osteo-fibrous canal in close relationship with other tendons, bursæ or tendon sheaths, adhesions were important. Moreover, round tendons were more difficult to suture and apt to become bulky. The second influencing factor was the suturing; the relationship to the blood supply and synovial fluid and muscularity of the tendons affected the success of the suturing and the method of suturing to be adopted. The third factor mentioned by Dr. Price was the treatment adopted at operation and the after-treatment. Dr. Howard had succeeded in the difficult cases illustrated that evening. At a meeting of the society some years earlier the late Dr. Mervyn Stewart had shown a patient with a foot cut down to the bone; in that case the skin had been sutured without union of the tendons and an excellent result had followed. That fact showed that an element of luck might be involved in the outcome of such injuries. At other times, since the tendons were sometimes hard to sort out after an extensive injury, a tendon might be unsuccessfully anastomosed to a nerve; further trouble would result.

DR. D. O. BROWN said that in the case of the first child shown by Dr. Howard the functional results seemed perfect. It was noteworthy that the operation had been performed within four hours of the injury; the time factor had probably been of importance in the good result. In many instances there was considerably more delay, which militated against success. He wondered whether Dr. Howard had considered the question of splinting after suture in the position of physiological tension; Dr. Brown had himself given the matter much thought and considered it a sound principle. He was also in favour of early immobilization.

Dr. Howard, in reply, said that the results were good and that the ulnar nerve recovery was especially gratifying. He thought that it was better to obtain full relaxation rather than to put any tension on the sutured tendons. The sutures were apt to be pulled out, and as tendinous material was elastic, some tension might occur in any case. He preferred to immobilize the affected part for approximately two weeks; activity then had no chance of tearing the sutures out of tendons. Dr. Howard added that some surgeons advocated movement within two or three days and had reported good results; but he was diffident and conservative.

Cervical Rib.

DR. G. NEWMAN MORRIS showed a girl, aged eleven years, who had been referred to the Children's Hospital by the school medical officer on account of the presence of a hard mass above the left clavicle. When he had first seen her, on April 24, 1939, Dr. Morris had been unable to elicit any symptoms related to the mass, and no sensory, motor or vascular changes in the left arm had been found on examination. In the skiagrams which he showed, he was able to demonstrate the appearances of a well-established cervical rib on the left side and of a rudimentary rib on the right.

Dr. Morris briefly recounted some historical facts concerning cervical rib. It was recorded that Galen and Vesalius had each described the condition. Sir Thomas Moore, in 1615, in an essay on the subject that "Woman has on more rib than Man", quoted the anatomist Columbus, who had described a female skeleton with a cervical rib. This statement had been heatedly attacked, it being stated that the extra rib represented the one by which Eve's skeleton exceeded that of Adam. Hunauld, in 1740, wrote the first scientific article on the subject. Gruber, in 1869, put forward the classification in grades which was in use to the present day. Keen, in 1907, wrote a very complete article discussing the anatomy and treatment of cervical rib; and Adson and Coffey, in 1926, had advocated scalenotomy for relief of the pressure symptoms. Dr. Thomas Murphy, of Melbourne, in 1910, was the first surgeon to excise a first rib for brachial neuritis.

Dr. Morris said that the age of his patient in relation to the cervical rib was a point of interest. Rosenmuller had reported such a rib in a six months' fœtus, and Southam and Bythell had reported four examples in girls ranging from the age of four years to that of twelve years; compression symptoms were noticed in one girl, aged twelve years. Davis and King, in America, in a review of twelve cases of cervical rib diagnosed in childhood, reported the occurrence of compression symptoms in a girl, aged six years; relief was given by scalenotomy. In conclusion, Dr. Morris stated that because of the absence of symptoms in the patient shown no treatment was intended; but he thought it was extremely likely that symptoms would result at a later date.

Dr. Howard said that no operative treatment was indicated at the time, but that the chance of later development of symptoms was considerable. The development of the limb and the outgrowth of the nerves would lead to prefixation of the plexus one segment beyond the normal. If the ribs were poorly developed and the plexus normal it would not be so liable to compression. It had to be remembered too that females had symptoms ten times more frequently than males. From the skiagrams it could be seen that there was an upward inclination from the *manubrium sterni*, which would undoubtedly settle down later; the patient would then develop pressure symptoms. She would almost certainly need an operation

then, probably scalenotomy combined with removal of the rib or part of it.

Dr. H. Douglas Stephens said that in his experience cervical rib was not very rare in childhood, but he had not seen an example of compression symptoms in a child. He remembered a child with shoulders of an accentuated sloping character, in whom he had felt hornlike projections when examining for palpability of the glands of the neck. He had often come across unilateral cervical ribs and had seen at clinical meetings quite a number in adults; they were associated with ulnar paresis and wasting of the small muscles of the hand. He had never removed a cervical rib, and he did not think it right that a child should be told that she had a cervical rib; the result might lead to neurasthenic features afterwards.

Dr. H. C. Colville drew attention to the discovery of the condition on routine examination at school; he said that this exemplified the importance of routine examination of young children. In that way Dr. Mona Blanch had recently discovered a very small Wilms's tumour occupying the lower lobe of a kidney.

Correspondence.

THE MEDICAL PROFESSION AND THE PUBLIC.

Sir: During the last decade the medical profession has lost caste. It no longer holds in the public esteem the high place previously accorded it.

The reasons for this have been cumulative.

Of them, the first undoubtedly is that the general standard of public education has been so raised that the professions no longer stand on a cultural pinnacle.

Another reason is that during the depression years every person with an income reaching four figures, or thought to reach four figures, came to be looked upon as something of a profiteer. At such times it is apt to be forgotten that the percentage drop in income is perhaps heavier in our profession than in any other, dependent as we are on receiving a share in the national income only at second or third hand.

The next reason, a much more serious one, and one for which we cannot be absolved from blame, is that in fighting a defensive action over the National Insurance Bill our official organization (the British Medical Association) came to be recognized for what after all it is, a trade union. The fact that this trade union stands for good work at least as much as for reasonable recompense for such work was not made clear—in fact was lost sight of. Leadership was poor and we found ourselves cleverly manœuvred into the position of scapegoat. This we fully deserved: it is our part to lead in all matters of public health, not to trail aimlessly behind lay politicians.

Today we have a dual opportunity to retrieve our lost prestige.

We must consciously and deliberately, as individuals and as a body, conceive and bring to birth a system of public health services (in the widest possible sense in which these words can be used) which is in accord with modern needs and which, while satisfying the community, maintains the standards in professional matters which we have rightly come to regard as essential. This, it seems to me, is the major task of this generation of our profession. Certain it is that great changes are coming. Let us then think socially and set about the onerous but necessary tasks of detailed planning and the assumption of leadership. If we fail in this, the loss to the community, and most of all to ourselves, will be irreparable.

Our other opportunity lies in clearing away the stigma of selfishness which has attached itself to us, with justification, through our refusal—for it is ours—to admit to Australia refugee medical men in sufficient numbers to supply national needs. In this State at the present time there are at least four country hospital centres with guaranteed incomes which remain medically unstaffed; there are at least two departmental vacancies long unfilled; and we know to our cost that there is a great shortage of *locum tenentes*. While this state of affairs exists the public is right in saying that the service it receives from the medical profession is not adequate. Meanwhile the British Medical Association of this State officially advocates a restricted quota of medical men within the already tiny quota of refugees being admitted to Australia—tiny, that is, relative both to our national needs and to the immense number, literally millions, of refugees from whom we can choose the very best and most suitable. If the suggestion of the local Branch is followed, only thirty medical men in all will be admitted to practice in the whole of Australia, perhaps two of these coming to this State. Not only so, but these thirty will be admitted to practice only after three years as students of one or other of the Australian universities—a period altogether out of the question in the case of married men stripped of their possessions by a predatory home (?!) government, a period too which is an insult to men already fully trained professionally and lacking only in knowledge of local conditions and standards.

This is the policy of the dog in the manger, and is recognized by the public as such. We have it in our power to recommend to the Commonwealth and to the various State governments, either directly or through the various medical boards (which are really ourselves), that a more generous policy be adopted towards refugees in general and towards medical men in particular. I urge that this be done. A generous gesture of this sort would cost us nothing, unless indeed we fear that foreign medical men are our superiors and that, triumphing over their immense handicap, they would take all the plums of medical practice; it would certainly go far in rehabilitating us in the eyes of the public.

Yours, etc.,

Alfred Jacobs.

Perth,
Western Australia,
August 6, 1939.

Post scriptum: Lest my name detract from the value of this letter, I should mention, I think, that I am not of Jewish religion, race, or descent; "pure Aryan", no less!—A.N.J.

HAVELOCK ELLIS.

Sir: In his scholarly appreciation of Havelock Ellis in the journal of August 5, Dr. R. S. Ellery states (page 233) that Ellis remained a "humble Licentiate of the Society of Apothecaries".

This is scarcely correct, for in the year 1936 he was elected a Fellow of the Royal College of Physicians of London.

Yours, etc.,

C. T. Ch. de Crespigny.

219, North Terrace,
Adelaide,
August 7, 1939.

A DISCLAIMER.

Sir: I beg to disclaim responsibility for a statement purported to have been made by me and reported in a Sydney newspaper on August 9, 1939.

The statement had reference to a case of *ectopia cordis* and was published without my knowledge or authority. Furthermore, I had not even been in communication with any representative of the paper concerned.

Yours, etc.,

G. N. Young,
Medical Superintendent, Royal Hospital for Women.

Sydney,
August 11, 1939.

Nominations and Elections.

THE undermentioned has applied for election as a member of the New South Wales Branch of the British Medical Association:

Reilly, Charles Patrick Cummerford, M.B., 1939 (Univ. Sydney), Royal North Shore Hospital, St. Leonards.

The undermentioned have applied for election as members of the Queensland Branch of the British Medical Association:

Leval, Ludovic, M.D., 1930 (Padua), Bank of Australasia Chambers, 406 Queen Street, Brisbane.

Lofkovits, Leopold, M.D., 1932 (Siena), Bank of Australasia Chambers, 406, Queen Street, Brisbane.

Notice.

READERS are reminded of the post-graduate course in obstetrics which has been arranged by the Melbourne Permanent Post-Graduate Committee. The course will be held at the Women's Hospital, Melbourne, from August 28 to September 2, 1939; the fee is two guineas.

Obituary.

CHARLES MATTEI.

WE regret to announce the death of Dr. Charles Mattei, which occurred on August 20, 1939, at Mosman, New South Wales.

Diary for the Month.

AUG. 31.—New South Wales Branch, B.M.A.: Branch.
AUG. 31.—South Australian Branch, B.M.A.: Branch.
SEPT. 1.—Queensland Branch, B.M.A.: Branch (Jackson Lecture).
SEPT. 5.—New South Wales Branch, B.M.A.: Organization and Science Committee.
SEPT. 6.—Victorian Branch, B.M.A.: Branch.
SEPT. 6.—Western Australian Branch, B.M.A.: Council.
SEPT. 7.—South Australian Branch, B.M.A.: Council.
SEPT. 8.—Queensland Branch, B.M.A.: Council.
SEPT. 12.—New South Wales Branch, B.M.A.: Executive and Finance Committee.
SEPT. 19.—New South Wales Branch, B.M.A.: Ethics Committee.
SEPT. 20.—Western Australian Branch, B.M.A.: Branch.
SEPT. 21.—New South Wales Branch, B.M.A.: Clinical Meeting.
SEPT. 22.—Queensland Branch, B.M.A.: Council.
SEPT. 26.—New South Wales Branch, B.M.A.: Medical Politics Committee.
SEPT. 27.—Victorian Branch, B.M.A.: Council.
SEPT. 28.—New South Wales Branch, B.M.A.: Branch.
SEPT. 28.—South Australian Branch, B.M.A.: Branch.
SEPT. 29.—New South Wales Branch, B.M.A.: Annual Meeting of Delegates.

Medical Appointments Vacant, etc.

For announcements of medical appointments vacant, assistants, *locum tenentes* sought, etc., see "Advertiser", pages xviii-xx.

BRITISH MEDICAL AGENCY OF QUEENSLAND PTY. LTD., QUEENSLAND: Medical Officer.
COMMONWEALTH DEPARTMENT OF HEALTH: Medical Officer.
IPSWICH HOSPITALS BOARD, IPSWICH, QUEENSLAND: Medical Officer.
MACKAY HOSPITALS BOARD, MACKAY, QUEENSLAND: Resident Medical Superintendent.
MINE OWNERS INSURANCE PTY. LTD., SYDNEY, NEW SOUTH WALES: Assistant Medical Officer.
VICTORIAN EYE AND EAR HOSPITAL, MELBOURNE, VICTORIA: Resident Surgeons.

Medical Appointments: Important Notice.

MEDICAL PRACTITIONERS are requested not to apply for any appointment referred to in the following table without having first communicated with the Honorary Secretary of the Branch named in the first column, or with the Medical Secretary of the British Medical Association, Tavistock Square, London, W.C.1.

BRANCHES.	APPOINTMENTS.
NEW SOUTH WALES: Honorary Secretary, 135, Macquarie Street, Sydney.	Australian Natives' Association. Ashfield and District United Friendly Societies' Dispensary. Balmain United Friendly Societies' Dispensary. Leichhardt and Petersham United Friendly Societies' Dispensary. Manchester Unity Medical and Dispensing Institute, Oxford Street, Sydney. North Sydney Friendly Societies' Dispensary Limited. People's Prudential Assurance Company Limited. Phœnix Mutual Provident Society.
VICTORIAN: Honorary Secretary, Medical Society Hall, East Melbourne.	All Institutes or Medical Dispensaries. Australian Prudential Association, Proprietary, Limited. Mutual National Provident Club. National Provident Association. Hospital or other appointments outside Victoria.
QUEENSLAND: Honorary Secretary, B.M.A. House, 225, Wickham Terrace, Brisbane, B.17.	Brisbane Associate Friendly Societies' Medical Institute. Proserpine District Hospital. Members accepting LODGE appointments and those desiring to accept appointments to any COUNTRY HOSPITAL or position outside Australia are advised, in their own interests, to submit a copy of their Agreement to the Council before signing.
SOUTH AUSTRALIAN: Secretary, 178, North Terrace, Adelaide.	All Lodge appointments in South Australia. All Contract Practice Appointments in South Australia.
WESTERN AUSTRALIAN: Honorary Secretary, 205, Saint George's Terrace, Perth.	Wiluna Hospital. All Contract Practice Appointments in Western Australia.

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